SAN BERNARDINO COUNTY
Its Mineral and Other Resources

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for the batteries. There is scarcely any limit to the possibilities attending the use of electric power in mining, and it promises to be to the mining industry as great an advance as the steam engine over horse-power. No one contemplating the use of electricity should allow the fact that at this plant a large body of water under a great head is used, to discourage them, as the plant does not require either the quantity or pressure here used. The company had the water and the fall to use it. A visit of inspection will well repay any mining man; and I expect to see the Dalmatia the Mecca to which all progressive California mining men will be journeying in the near future.

Garden Valley.

The operations of the Taylor mine have infused new life into this section, and there is now every reason to believe that within another year this will be one of the best mining camps on the mother lode in the State. The mines are here. All they want is to be operated on the same scale, and to be as carefully equipped as in the Taylor, now known as the Idlewild G. M. Co. The main working shaft is down 500 feet on the vein, which runs from 4 to 30 feet. Previous millings of the ore gave an average of $8 a ton.

The mill has twenty 950-pound stamps, and is built to allow the placing of an additional 20 stamps. The ores are concentrated by the Woodbury concentrator, one concentrator to each battery, or four in all. Power is furnished by three Pelton wheels. The mill throughout is a model, and it would be a difficult matter to excel it. If there is any fault, it is this: the hoist is in the mill. This, while it is the rule should be the exception as in the case of any accident or fire, it is well nigh impossible to get the men out of the shaft. Messers. Hayward & Hobart make it a rule in all of their mines to have the hoist out in the clear with nothing but the frame over the shaft, and I think it would pay other mining men to follow their example. The Taylor system of water-supply is somewhat original in this, that lacking a site for reservoir to store surplus water, they have constructed a canal 800 feet long, 10 feet wide, and 6 feet deep along the summit of the mountain to act as a reservoir; this gives them a steady supply and 310 feet pressure at the mill.

Mr. E. W. Chapman is manager and Mr. W. E Denison, formerly of the Coffee creek hydraulic mine of Trinity county, superintendent.

The Rozenorans mine joins the Taylor, and is held under bond by them. The mine has a complete mill, and will, no doubt, be put in operation this season.

The Emma

Joins the Rozencranz. Mr. Bell, the owner, has for years past worked this mine for its pocket ore, sinking shafts over 100 feet deep single-handed. Now that the Taylor is coming to the front, he has every reason to believe that his property will prove a milling proposition. Up to this time he has confined himself to the quartz seams in the dyke occupying the lode.

The Lone Jack

Adjoins the Emma. This mine is opened to a depth of 416 feet, with a drift south of 100 and north of 80 feet on a ten foot vein. At present the mine and ten-stamp mill are idle, but will start up now that they can handle the water. Mr. H. Lawrence, formerly of the New Brunswick antimony mine, is superintendent.

Esparanza.

Mr. N. O. Burlingham is superintendent and has put the shaft down 200 feet and crosscut, showing the vein to be 54 feet between walls of ore that will mill $5 a ton. The ores carry one per cent of sulphurets running from $90 to $540 a ton.

Ivanhoe and Eclipse.

Mr. Fletter, of the California Cap Co., is operating the mines Ivanhoe and Eclipse. The work is all on the Ivanhoe. The vein has a diorite hanging and talc slate wall, with an exceptionally fine gouge. Throughout the length of the Ivanhoe numerous cuts and shafts show a strong vein. The main working shaft is down 200 feet. The mine has a complete hoist in good order, and only needs capital to make the property one of the best in the section. The former operators sunk 200 feet and then drifted 50 feet into the hard diorite hanging wall. The foot wall was not crosscut to, nor was there any drift run on the vein. At other points on the vein the ore shows its mineral character, and throughout its entire course, with its croppings of from two to 20 feet, gives every indication of a good mine.

I know of no property where a small amount of money intelligently applied will be so apt to show up a good mine, and the property can be secured for a nominal sum, with privilege of first developing. El Dorado has a very promising future in her mining industry. Her past history is about to be repeated, and the quartz mines find the same El Dorado that first, through Marshall's discovery, drew attention to the gold of California. E. H. SCHAEFFLE.

THE proposition of incorporating several mining locations in Silver City district, Nev., and listing the stock on the San Francisco Stock and Exchange Board, is again being considered, now that the rate for listing has been reduced to one-half the former cost. So far none of the locations in that district have been explored to a depth of 500 feet except the Dayton and Kossuth.

San Bernardino County.

Its Mineral and Other Resources.

NUMBER I.

[Written for the PRESS by JAMES H. CROSSMAN.]

San Bernardino is the banner county of our State in area, if not in population and taxable property. It has within its boundaries all the elements of prosperity in great abundance. Its mineral and agricultural resources are probably unsurpassed by any county in our State. The division line is boldly and distinctly defined by that mountain chain known as the San Bernardino range. That portion best adapted to agricultural pursuits lies to the south, which is not void of mineral wealth, but the mineral region proper that forms the metallic domain of this county lies to the north of this mountain range. The northerly boundary of San Bernardino county is Inyo county, with the State of Nevada on the northeast, while the Colorado river which divides the State from the Territory of Arizona, forms its Eastern boundary. It is bounded on the south by San Diego county, while Los Angeles and Kern lie to the west. It contains within these boundary lines 23,476 square miles. Much of the largest portion of this area lies north and east of the San Bernardino range, of which there are of mountains and agricultural lands 6000 square miles, and of the so called "desert land" we find 17,476 square miles, a large portion of which is susceptible of cultivation, providing storage reservoirs, and artesian water can be obtained.

The Valley of San Bernardino,

Upon which Dame Nature has with such a liberal hand bestowed her bounteous gifts and blandest smiles, is already noted far and wide for its fertility of soil and picturesque landscape. It is situated directly east of the city of Los Angeles and about 50 miles south of west from the nearest point to the Pacific seaboard. The valley proper has a length east and west of about 60 miles, with an average width of 15 miles. We find here a varied combination of both soil and climate. It is here that the orange attains a greater degree of perfection than in any other locality on the Pacific Coast, as can also be said of all the varieties of deciduous and citrus fruits that are adapted to a semi-tropical clime. Clover, alfalfa, barley, wheat, oats, as well as every vegetable known to man, yield abundant crops of a superior quality. Walnuts, almonds, chestnuts, filberts, peanuts and pecans are also products of this favored soil, while the raisins grown beneath the benificent rays of the semi-tropical sun have a national reputation. It is the home of the grape. The wine manufactured in this county is highly esteemed and commands a good price both at home and abroad.

Cities and Towns.

Outside of the city of San Bernardino are many beautiful and attractive suburban towns. The most prominent are Redlands, Lugonia, Riverside, Gladysta, Crafton, Banning, Mentone, Highland, Harlem, Old San Bernardino, Sunny Slope, Colton, Etiwanda, Rialto, Urhita, Cucamonga, Beaumont, Ontario, Terracina, Mound City, Chino, Rincon, South Riverside, East Riverside and Hermosa.

The climate in the valley is mild and equable, the thermometer seldom reaching the freezing point. About 17 inches of rain is the average.

Artesian Water

Can be obtained in many places both north and south of the San Bernardino range in both desert and valley. In the latter, 121 artesian wells alone furnish 13,000,000 gallons every 24 hours, while the combined annual flow is several billions. In San Bernardino and the adjoining valley over 400 of these streams are unceasingly contributing their quota of living water pure and crystalline. The pipes are from 2 to 12 inches in diameter; 300 wells are within the city limits. The principal source of supply to the Gage canal and irrigation system is drawn from this source. In addition to the supply from creeks and wells, reservoirs for the purpose of storing water have been built in the mountains. The lake formed by the Bear Valley dam makes the largest storing reservoir in State for irrigation purposes. We have taken the liberty of publishing the following description of this dam written by Edson D Hall for the San Bernardino Board of Trade and published by that deserving institution illustrative of the resources of the county, at the same time acknowledging our obligations to Mr. J. C. Scott, secretary of that institution, for information and favors extended.

The Bear Valley Dam

Is located at the outlet of the Bear Valley into Bear creek, which empties into the Santa Ana about five miles below, and is one of the most favorable locations that could have been selected. The valley is surrounded by mountains, and has no other outlet but this, which here is very narrow with precipitous rocky sides. Into the solid rocks of this gorge the dam is abutted, and is built on a curve, arching inward, forming the arc of a circle, with a diameter of 345 feet. Its dimensions are: On top, 300 feet from abutments, 60 feet high from the bedrock of the creek in the highest point, and it conforms to the mountain slope on either side. Its base is 20 feet wide, and from this it slopes to three feet wide at the top. Its average co-efficient of safety is 25, and it would stand twenty times its present pressure. The whole is built of vast granite blocks which were quarried near the margin of the lake and floated to the wall on scows, while a derrick built on a floating raft took them and placed them in position. The rocks were laid in Portland cement and all the interstices were filled with beton. The cement had to be hauled in wagons from Colton by way of the Cajon Pass and Mojave Desert, and thence down the valley to the dam, a distance of 100 miles. A four-horse team hauled eight barrels and it took ten days to make a round trip. Sixteen hundred barrels of cement were put into the dam at a cost of $13 per barrel, including the freightage.

The engineer was F. E. Brown of Redlands. The State Engineer of California has pronounced the work not only efficient but a remarkable piece of engineering.

The lake formed by the dam extends back into Bear valley over five miles, with an average width of nearly a mile, and a depth of 12 feet, and contains the enormous amount of 8,000,000,000 gallons. To supply this the valley furnishes over 60 square miles of drainage area, on which falls three times the amount of water which the lower valleys receive. The dam stands 6400 feet above sea level. The quantity of water held in reserve now is sufficient to irrigate 50,000 acres of land, and to supply a population of 500,000 with water for domestic purposes. Much water still goes to waste in Bear valley and elsewhere in the mountains. The capacity of this reservoir will be enlarged. Other dams will be built. Nowhere else in Southern California does so much rain and snow fall as on the San Bernardino mountains. The unfailing creek and rivers, the large number of flowing artesian wells, and the limitless supply of water in the lofty mountain valleys, which may be had for the expense of storage reservoirs, unite to make San Bernardino the best watered county in Southern California, we might almost say in the State.

The waters from Bear valley and other supplies in the mountains find their way by natural channels to the plains. At the mouth of the canyons, stone-lined ditches, flumes, and cement pipes convey the supply to the cultivated tracts. The best method of irrigating is to have a distributing reservoir into which the stream can run continuously, and be drawn upon as needed. Fruit lands need irrigating only about once in four to six weeks. After the ground is thoroughly soaked, two or three days are allowed to elapse before it is gone over with a horse cultivator. The surface of the ground is thus prevented from baking, and the moisture is retained for several weeks.

Transportation Facilities.

Two transcontinental railroads pass through the county, which, with the advent of the extension of the Utah Southern (now in process of construction at least as far as Pioche in Nevada) through the heart of the desert mineral region to some point on the Atlantic & Pacific R. R. or to tide water, would make three roads. These, with the California Central and the San Bernardino Valley R. R. now building, will make San Bernardino a railroad center of great importance. At date, San Bernardino is also the banner railroad county of the State, at least so far as mileage and county assessments are concerned. There are 417 miles of standard-gauge road and 321 miles of motor and narrow-gauge, with 21 miles of electric roads within its boundaries. These several companies pay assessements on $4,991,250, the value of the available railroad property in the State being $26,000,000.

Though the metallic domain proper lies to the north of the San Bernardino range, its valley region is not devoid of mineral wealth. The ores of tin of great value and immense quantity occur in the Temescal range of mountains, on the San Jacinto ranch; there are also mineral paint, gypsum, bituminous rock and coal measures. There has also been found a stone suitable for macadamizing streets. The manufacture of tiles and brick from a superior quality of fire-clay is an important and a growing industry.

Statistical.

For the following statistical data I am also indebted to I. C. Scott, Esq., Secretary of the Board of Trade of San Bernardino, and to Mr. Hale.

The tax levy for the year 1890 is $1.50 on the $100. The county is free from debt.

Acreage under cultivation for the year 1889, 64,410. The principal products were as follows:

	Value.
310,000 boxes oranges	$744.000
4[illegible]0 boxes lemons and limes	17,000
325,000 boxes raisins	546,250
650 tons dried fruit	143,000
40,000 cases canned goods	160,000
90,000 lbs. English walnuts and almonds	6,750
345,000 lbs. comb and extracted honey	23,800
240,000 gallons wines and brandy	62,000
225,000 centals barley	146,[illegible]50
Wheat, oats, hay, and other products	100,000
Total	$1,949,050
Minerals	1,350,000
Grand total	$3,299,050

Mr. Scott also states in his report to the Board of Trade for the fiscal year ending December, 1889, that the earnings of the county will average more than $100 to each man, woman and child in the county.

The above statistics, which can be relied upon as correct, show that San Bernardino county, taken from a financial standpoint, is now the leading county of the southern portion of the State. If she can do this with her paucity of inhabitants and undeveloped resources, what can she do with her plans for irrigation works completed, unimproved lands under cultivation and her desert regions pouring forth their treasures of mineral and metallic wealth.

Minerals in the Desert Regions.

From its present arid condition but little of the territory is suitable for agricultural purposes, without the assistance of artesian wells or storage reservoirs; but Mother Nature, ever prodigal, has sown broadcast over this dry region, immense stores of mineral wealth, rendering it the home of the miner and prospector, the advance guard of civilization. Of the many minerals and metals known, useful to man, there are very few that cannot be found in abundance, bituminous and carbonaceous products the exception. Intense volcanic action has destroyed all vestiges of inflammable materials, and the rocky structure shows everywhere the evidence of intense heat. At a very recent period in the geological history of the world, volcanic cones that ejected rivers of molten lava were in existence. The evolution of powerful gases and thermal waters through cracks, seams and fissures in the earth's crust, have, through chemical action on its mineral contents, metamorphosed and colored them with the bright hues of the rainbow, and all of their several shades harmoniously blended. The colors are vivid and pronounced; yellow, blue, black, red and white, with their several combinations and shades of purple, pink, lilac, green, brown, etc., the rocky structure either standing in vertical strata or on inclined planes, with thousands of acres of colored earth lying in a horizontal position at the base of the cliff, derived from the decomposition of the rock in places. The short mountain chains and isolated peaks, with which the desert region is dotted, are fissured with metalliferous veins of extraordinary richness. Here are gold-bearing veins, and veins charged with silver combinations. Copper is found in both a metallic form and as carbonates, oxides and sulphides. The ores of lead are found in veins and deposits of great strength and purity. The oxide of tin (cassiterite) is found, in placer, in immense quantities. San Bernardino, at no distant day, will be to the United States what Cornwall has been to Great Britain.

The most valuable of all of the ores of iron magnetites occurs in the Mojave district, enclosed in vein-shaped fissures from 20 to 100 feet in width, this ore assaying from 60 to 85 per cent metallic iron, free from phosphates of sulphur, only requiring the "iron horse" for transportation of the ore to fuel or of fuel to the ore, rendering us independent of the foreign product. There are alkaline earths and saline products, soda and borax, in inexhaustible quantities, the latter not only on and near the surface as an efflorescence but in vein-shaped deposits of remarkable purity and great strength. Full particulars of this remarkable deposit will be given under its appropriate head. These minerals and their metallic products with cheap means of transportation will eventually prove very profitable. The discovery and production of borax that abounds in this region was the factor that reduced its price from 65c. to 6½c. per pound, its present quotation Large surface areas are covered with rock salt that penetrate to unknown depths and are of a crystalization so pure that a printed page can be read through a cube of one foot of this product. The wagon road from Mojave to Furnace creek, built by Coleman & Co. for hauling borax from their mines in Death Valley to rail, was compelled to use cutting tools for a considerable distance before they could haul their wagons over this rough, hummocky saline material. Granite, marble and sandstone for structural and ornamental purposes can be found of a superior quality in this county. Asbestos and mineral earths suitable for paints are known to exist; and niter is reported to have been discovered. This immense treasure-house of metallic and mineral wealth has heretofore been but little developed for want of cheap transportation.

(To be Continued)

MINING is very active in Montana. It is estimated by competent miners that there is double the amount of work being done on the quartz claims in the vicinity of Butte than during any previous year since quartz was discovered in that vicinity. Especially is this true of the locations north of the city, where at least 150 are in course of development, two-thirds of which are paying propositions. As for the others, all that is necessary to make them such is development work, which is progressing as fast as steam and horse-power can accomplish it.

ANOTHER CHANCE FOR INVENTORS.—There is considerable complaint in some quarters about the annoying, rattling noise caused by the operating of type-writing machines, and it is positively disagreeable to persons in the same room who are compelled to tolerate it continually every day. There is no reason why a noiselessly operated machine should not be constructed. Let the inventors solve the problem.

EUGENE B. BURDICK, a well known mining man, formerly of Nevada but now superintendent of the Equator mine, near Placerville, El Dorado county, is visiting in this city. Mr. Burdick's recognized mining ability has been more than confirmed in the success he has met in opening up the Equator mine.

THE Hueneme *Herald* says there are 110 flowing artesian wells in that valley.

San Bernardino range the scarcity of timber is a matter of serious consideration.

Towns.

The desert country north of the San Bernardino range contains the following mining and railroad towns: viz.: Victor, with 100 inhabitants; Oro Grande, 150; Barstow, 150; Daggett, 150; Calico, 400; Ivanpah, 25; Providence, 50; The Needles, 400. Each of these forms a base of supplies for interior mining districts. These towns contain variety stores with large stocks of goods suitable for their trade, hotels, saloons, churches and schoolhouses.

Temperature.

The desert has a mean temperature during the summer months of 90° Fahr., that is, during the month of June, July and August. During the balance of the year the thermometer ranges from 70 to as low as 32°, very seldom, however, falling below the freezing point. The mean annual precipitation is estimated at six inches, but no rain gauge has ever been kept verifying this fact until recently.

Precipitation.

At Mojave Station for six months ending Dec. 15, 1889, rain gauge kept by C. H. Fairchild, agent, shows the annexed figures, the "season" commencing July 1st and ending June 30th following:

1889.	Inches.
July	00
August 31	.81
September 2	.15
19	.12
October 8	.04
20	.50
21	.68
22	.50
23	1.03
24	.36
November 18	.15
29	.10
30	.20
December 1	.80
2	.50
7	.80
12	.95
13	.80
14	.10
15	1.00
Total	6.52
Dec. 15, 1889 to June 30, 1890	5.95
Total for season	12.47

Mills.

Within the confines of the desert region there are in operation 16 stamp-mills dropping 187 stamps; the cost of these has been about $600,000. The silver bullion annually shipped from Daggett, owing in a measure to the low price of silver, has not been as great for the past two years as formerly, but it is estimated that notwithstanding the depreciation, that the Calico mines together with the bullion returns from Ivanpah, and other localities for the year 1889 amounted in the aggregate to $900 000 in addition. Gold, silver, copper and lead ores that were shipped to Kingman, Denver, and San Francisco equaled $200.000, and that to other points for reduction, $50,000, making a total of $1 150,000. The product of the county of borax, building stone, marble, onyx, lime and bitumen equals $200,000, so the total annual product is $1,350,000.

The City of San Bernardino.

The city of San Bernardino has but recently been incorporated, and, as the county seat of San Bernardino county, is located near the central portion of one of the most beautiful and fertile valleys in our State. The city lies in close proximity to the mountain range of the same name, whose lofty, snow-clad peaks (Grayback and Old Baldy) rear their heads to an elevation of 11,600 feet above the level of the sea. The city proper covers an area of two miles square, and has an elevation of 1075 feet above the level of the sea. It contains an estimated population of 10,000, which, within the past few years, has rapidly increased. Though one of the oldest towns in the State (having been settled by the Josephite Mormons, in the year 1849 and 1850), it is only of late years that it has thrown off its antiquated garb and come to the front as a modern and model city. It shows now all the evidences of prosperity; substantial blocks of buildings of modern architecture, built of marble, granite, stone and brick; first-class hotels with all modern improvements, elevators, electric lights and diamond-bedecked clerks; private residences, surrounded by shrubbery, lawns and ever-blooming flowers; are evidences of refinement and culture. There are four banks in the city with a combined paid-up capital of $718 000. There are two live daily newspapers, and 46 business buildings were erected during the past year, at a cost of $552,300, and 190 residences at a cost of $299,500. A sewer system, with over nine miles of pipe, is now completed. Three miles of artificial stone sidewalk, were laid, and the city otherwise beautified at a cost of $153,000. It contains 7½ miles of street railway, and 16 standard-gauge passenger trains depart from, and as many more arrive at the city daily. Three motor roads enter the city from different directions from the valley lands. Twenty-three trains of human freight reach the heart of the city daily, making it a railroad center and a receiving and distributing point for the surrounding country, particularly from that immense region lying northerly to the Nevada State line, and east to the Colorado river. The climate is unexceptional. Artesian and flowing water abounds, rendering the city a desirable dwelling place. The total assessment roll last year was $4,070 300, with prospects of a heavy and rapid increase the coming year.

Riverside.

Riverside, the garden spot of the county, was founded in 1870. Since that date its population has rapidly increased and now numbers in excess of 10,000 souls. The soil is strictly agricultural in character, though in the immediate vicinity of a mineral district which in the near future will, from the product of its mines, sustain a large and thriving population. I refer to the tin mines of Temescal, on the San Jacinto estate—Rancho de Sobrante—from which Riverside derived its title. On this estate, aside from the tin lodes, there are promising veins of gold, silver and copper of great strength returning high assay values.

The Pinacate gold mining district, geologically in the same porphyritic formation that surrounds the Temescal tin, contains both gold and silver bearing veins undeveloped, owing in a measure to the blighting effects of the litigation that surrounded the title to the whole of the San Jacinto estate. This being now removed, work of development will soon be resumed.

Riverside is famous for its semi-tropical fruits and its vegetables, the soil and clime being especially adapted to their culture. The dryness of the atmosphere insures their maturity to perfection, rendering Riverside the garden spot of the county and the home of the fruits of the semi-tropical clime. There the orange takes precedence as a product. It is celebrated both at home and abroad for its size, delicious flavor and sweetness. The yield of this fruit for the year 1889 amounted in value to $1,000,000. The next in importance is the grape, as the raisins can be cured to perfection in this favored clime. The raisins from this locality are pronounced by competent judges equal to the celebrated imported Malaga. The last year's product of the vine returned a figure in excess of one-half million dollars. But this is not all. Riverside produces peaches and apricots of a delicious flavor, vegetables, grain, hay, etc.

The business portion of the town is modern in construction. The town and suburban residences are models of beauty and denote a high state of prosperity. Railroad connection with the Southern Pacific at Colton by a motor, and the Santa Fe has extended its line to this place. Artesian wells furnish an abundant supply of water for domestic and irrigation purposes.

Redlands.

This place is situated at an elevation of 2000 feet above the level of the sea. It is the third city in importance in San Bernardino county, with a population of 2500. Situated ten miles from the capital and on the line of two transcontinental railroads, it is a baby in age, having been baptized and christened in 1887, but it is a giant in growth, containing over 30 brick business blocks, from two to three stories in hight, with many beautiful residences, opera house, city hall, etc. The fathers of the town were Messrs. E. G. Judson and F. E. Brown, the latter being the originator and projector of the great Bear Valley dam, a masterpiece of engineering skill and workmanship which has already added so largely to the prosperity of the county.

(*To be Continued.*)

VIEW OF THE SOUTHERN END OF LAKE ZURICH, WITH THE ALPS IN THE DISTANCE.

A Scene on Lake Zurich.

To give our readers a little change from contemplation of Pacific Coast scenery, we present this week an engraving of one of the most beautiful scenes in Europe, a part of the Lake of Zurich and its surrounding mountains. The Lake of Zurich, lying in the northeastern part of Switzerland, is celebrated for its picturesque beauty and its historical interest. The lake is 23 miles long and 2½ miles broad, and it extends from the city of Zurich in a southeasterly direction, nearly filling the valley to the hills on either side, which are the foothills of the Alps. The shores nearly its whole distance on both sides are sprinkled with the finest villa dwellings, owned by people of all nations. The engraving on this page represents the southern part of the lake, with its beautiful islands and shores, and shows the Alps in the distance. On the island upon the right are graves of some of the leading men of the Reformation, for here they took refuge from persecution.

RAILROAD ACCIDENTS.—A Cincinnati man, who has preserved a record of 320 railroad accidents, happening in this country in the past year, finds that only 13 out of the lot occurred from causes beyond human control. The others was due to drunkenness or carelessness.

and the deposit leveled up, the heavy bottom material increasing and the lighter top decreasing in depth as the head or source is approached. A large percentage of this fine top gravel deposit appears to be of modern make, probably having its source from the big slides that occurred during the modern erosions, which are not likely to recur. It will be particularly observed here that nearly all of this fine gravel and light material on top has been washed off in former years with the old hydraulic appliances, that would be useless now on the bottom deposit of bowlders and hard, heavy material, which can be easily worked by the improved methods.

By adapting the principles involved in the natural method of deposit, as observed here, a location could be selected on the North Fork, where a permanent dam could be constructed that would retain every foot of the heavy bottom material of this extensive deposit, within the limits of ten miles from the dump; and all the lighter material passing the dam would affect the navigable streams but little, if any more than the natural wash from the plowed lands on the big ranches in a high flood season.

Protecting the Miner.

There is a great deal of talk about protection. If there is anything in this country that needs protection it is the great mining industry. Not protection from foreign pauper labor but from the Government itself. The present policy adopted by it is a monstrous wrong to an industrious class of its citizens. By a decree of its courts, they are deprived of the right to use their own rightfully acquired property. And if extended to the extreme limit, the principles laid down as a precedent by the courts to be followed for centuries regardless of changed conditions. If one class can be restrained, others can be where the results differ only in degree.

The drift and quartz miners loosen the material hundreds of feet beneath the surface, and the rancher loosens it on the surface, and it is all carried into the rivers alike. What is the difference whether the material is loosened with the pick or the plow? The Government infringes on right and justice by appropriating the public money to be used against a legitimate industry, and by its hirelings in hunting down as outlaws and moonshiners a law-abiding class of its citizens. It has reversed the great republican principle upon which it was established—"the greatest good to the greatest number." It used to be the almighty *silver* dollar, now it is the supreme $20 gold piece that moves the world. Gold is an actual necessary of life to the State, the nation and the mercantile world. Here then are millions directly interested, besides those engaged in its production, on the one side, who are to be deprived of this necessary of life, so that a few individuals in a comparatively small locality on the other side may enjoy the privilege of raising a few tons of wheat and potatoes.

To think this great mining industry has no protection—no recognized rights in our statute; an industry that sent out its product in hundreds of millions of gold, which sustained the credit and possibly preserved a united government. The Government should aid and protect the industry that laid the foundation and built up a prosperous State, that shines a bright, golden star in the firmament of her sister States.

The Great Blue Lead.

The "Great Blue Lead," according to all the writers and talkers, is found in most all of the mines as a separate and distinct lead or deposit and wherever found is invariably rich. None of them, so far as we know, have attempted to give any idea in regard to its source or account for its reputed exclusive richness. Running north and south through Nevada and Placer counties about on the course of the bedrock, near the township line between townships Ranges 10 and 11 East, and just above most of the extensive gravel deposits along here, is an extensive belt of serpentine formation from one to three miles in width. On the Middle Fork divide, the Brimstone plains is a prominent point on this formation.

As a natural result this formation gives character to the deposit below. We accordingly find this peculiar deposit of blue gravel in all of the deposits below, or to the west of the Serpentine, whereas it is not found above or east of it, which is also corroborative proof of the course of the ancient channels.

In the locality of Gold Run and Dutch Flat, just below the western border of the Serpentine, is an extensive body of this blue cemented gravel, which has been worked on and opened out, so that it can be traced continuously from Indiana hill to the upper end of the Dutch Flat portion of the deposit. The blue gravel here, as in all other localities in proximity to the Serpentine, forms the bottom strata on the bedrock, and the extent depends on the forces operating and the length of time continued, just the same as in all other deposits.

(To be Continued.)

MRS. C. W. BRICE offers the sum of $6000 in aid of astronomical research this year. The sum will be divided, and, in general, the amount devoted to a single object will not exceed $500. Precedence will be given to institutions and individuals whose work is already known through their publications. Applications are invited from astronomers of all countries, and should be made to Prof. Pickering of Harvard College, before Oct. 1, 1890, giving complete information regarding the discovered objects.

San Bernardino County.

Its Mineral and Other Resources.

NUMBER III.

[Written for the PRESS by JAMES H. CROSSMAN.]

Colton

Is an incorporated city, laying at an elevation of 976 feet. It contains about 1200 inhabitants, and is situated at the junction of two transcontinental lines of railroad, the Southern Pacific and the Santa Fe. The city is about three miles distant from the city of San Bernardino, with which it is connected with the California Southern and a motor railroad. Colton is a modern-built city of growing importance, and a rival of San Bernardino to the extent of bidding for the county seat when the new court house is ordered to be built. The business portion contains many substantial buildings of brick, marble, stone, cement and wood, of modern architecture, and many beautiful residences surrounded by luxurious gardens and lawns adorn the suburban streets. Handsome churches and commodious school buildings add to the attractions of the place. Banks and well-arranged hotels, together with a well-kept public park filled with semi-tropical flowers and shrubbery, give to the place an air of refinement and prosperity. The town is abundantly supplied with water, and the streets are broad and systematically laid out. The principal buildings consist of the Union and Gilbert and First National Bank blocks, Transcontinental and Marlborough hotels, new city hall, etc. The leading business house, the Colton cannery, employs 300 hands. There is a lumber-mill, pipe-works, feed-mill, brick-works, etc. From Slover mountain, three-quarters of a mile from town, large quantities of lime and marble are being extracted and shipped by rail to a market. Large quantities of fruit are grown, gathered, canned and shipped from this place. This town is steadily increasing in population, and bids fair in the near future of becoming one of California's most promising inland towns.

Ontario.

Owned by the Ontario Land Co., is worthy of note as the "Athens" of San Bernardino, with its college and schoolhouses, and the famous Euclid avenue and gravity street car. About 3000 acres of land are under cultivation and producing principally citrus fruits. Over 100 tons of raisins were shipped from this locality last fall and an evaporating establishment is in process of construction for handling deciduous fruits. The soil and climate are particularly adapted to the growth of oranges, lemons and prunes. The Santa Fe railroad crosses the colony.

Chino,

With a population of 200, is situated a few miles north of this town. A narrow gauge railroad connects with the Southern Pacific. The town boasts of a hotel, bank, stores, and a newspaper. Richard Gird, Esq , is the master spirit.

Banning

Is situated in San Gorgonia pass and located on the dividing line between fertility and sterility. The soil to the westward is fertile and productive; easterly, barren and sandy, it being on the borders of the desert; westerly, a luxuriant growth of vegetation; barley, wheat and fruit is seen, the latter of excellent flavor; while easterly nothing meets the eye but a sandy waste of desolation as far as can be seen. Banning has acquired quite a reputation as a sanitarium, particularly for invalids afflicted with pulmonary or bronchial diseases, which is undoubtedly owing to the dryness and purity of the atmosphere. The town supports a good hotel, churches and a school, as well as a weekly newspaper. The elevation of this place is 2000 feet, and the population numbers 600.

Beaumont,

Formerly known as San Gorgonia, is situated on the San Gorgonia Pass and contains many handsome buildings and a fine hotel. It is a flourishing town of 500 people, and a trade center for a large population of thriving and prosperous farmers in the valley. The Southern Pacific railroad passes directly through the town. Beaumont, like Banning, is noted as a health resort.

From San Bernardino we cross the summit of the San Bernardino range through Cajon Pass at an elevation of 3819 feet, entering the desert at Hesperia, a paper town, with its deserted, unfinished and unoccupied buildings; elevation, 3184. We descend into the Mojave desert proper and reach

Victor.

Altitude 2713; population 150; situated on the Mojave river. It is on the line of the California Southern railroad, 40 miles northerly from San Bernardino, 20 miles southwesterly from the Ord mountain and the mining district of that name. Victor forms a trade center and supply point for Holcomb and Bear Valley mining districts, Morongo district, North Central, Galena Camp and West camps of Silver mining district; also for Old Woman Spring district, for the Side Winder and other mines in the vicinity.

In the immediate vicinity of the town are two extensive granite quarries which are in constant operation, the rock finding a ready market in the southern portion of the State. The town contains two general merchandise stores, two stables, feed-yard, blacksmith shop, schoolhouse and church. The owner of the town site being strictly a prohibitionist, no intoxicating liquors are sold within its limits.

Oro Grande

Is on the banks of the Mojave river, 45 miles northerly from San Bernardino. It has 150 inhabitants and is a station on the California Southern railroad and forms a distributing and supply point for a large area of the surrounding mineral regions, farmers and ranchmen who cultivate land that lies on the borders of the river. There are lime quarries in operation in the vicinity, the product of which is forwarded by rail to San Bernardino and Los Angeles, Arizona and Lower California. Two large double patent kilns are in constant operation, giving employment to quite a number of men. The adjacent foothills and low ranges of mountains within a radius of from 10 to 12 miles have long been known to contain large and valuable veins containing the ores of gold, silver and lead, which, owing to their accompanying bases, rendered them so rebellious that they could not be profitably reduced by the free-milling process. A modern ten-stamp mill was erected on the banks of the river, using its water for power to reduce these ores. It proved a failure, notwithstanding the richness of the ores, and the mill now lies idle. It is reported, however, that a 50-ton smelter is in process of construction, which, with the rich silver-lead ores in the vicinity as a flux, will soon remedy the evil and give employment to a large number of men. The town contains the usual number of hotels, supply stores, stables, blacksmith and wagon shops, with a neat church and schoolhouse. Many small, well-cultivated farms surround the town. A ditch from the Mojave river carrying 1500 inches of water affords 30 feet of pressure head at the outlet for machinery purpose.

Barstow.

The elevation of this place above tide-water is 2105 feet. It is situated at the junction of the Atlantic and Pacific, with the California Southern railroad on the Mojave river. It is a thriving business town and contains about 100 inhabitants. There is a large and commodious railroad hotel and eating-house, a well-built depot, round-house and repair shop, and several restaurants and supply stores, which have a good local trade. Water is easily obtained from the Mojave river upon whose southerly banks the town is situated. There are quite a number of silver-lead mines in the vicinity that would be tributary to this point, should reduction works be erected. A survey line has been run from the present terminus of the Utah Southern to this place, for the purpose of forming a junction with the A. & P. R. R. Should this road be completed there could be no better locality for an extensive smelting plant to be established on the same principle as that of Hill's in Colorado. In that event the Carson & Colorado R. R. would form a junction with the U. S. R. R. at Leach's Point, in the desert, and as a feeder supply the main trunk. This line of road would pass through the heart of the desert regions of San Bernardino, which we have in brief, and will show in detail possesses immense stores of mineral wealth.

Daggett

(Altitude, 2002; population, 250) is situated at a point near the Mojave river, 85 miles northerly from the city of San Bernardino, on the line of the Atlantic & Pacific R. R., which forms a junction with the California Southern at Barstow, and with the Southern Pacific at Mojave. It is the receiving and distributing point for that immense area of desert mineral land that lays to the north. east and west. The silver and borate mines of Calico are celebrated for their richness. These mines are practically inexhaustible, and form the Comstock of the desert regions. Ord Mountain, with copper and gold, the lava beds of silver-lead and silver, Alvord, Solo, Silver Lake, Resting Springs districts and, in fact, the whole of the southern portion of the Death Valley region, are at present tributary to this town, it being the terminal point from which mail matter is made up and distributed to the numerous interior post-offices. Among the most prominent of Daggett's enterprising men is J. B. Osborne. To him is due the credit of having accomplished more toward the development of the mines in the desert region, than any other man in the southern portion of the State. He is a large mine-owner, a heavy operator and an inventor of no small capacity. Seeing the necessity for means of transportation over the barren and sandy waste of this desert region, other than by freight trains, he has recently invented a "self-propelling wagon" for transporting ores and supplies to and from such mining property as is remote from railroad facilities, thereby avoiding the necessity and heavy expense attendant upon the employment of mule teams. This steam wagon, at an early date, will be in full operation. The commission and forwarding house of Earl & Co. are an omnipresent figure, and form an important adjunct to the business portion of this as well as all frontier towns and mining camps in the State. Postmaster and County Supervisor J. A. Johnson, in addition to his duties of receiving and distributing the mail, administers the solid necessaries of life to a large area of the surrounding mining country from a varied and extensive stock of goods. Twaddle & Pueltz are also numbered among the live business men of this thriving town, carrying a large and extensive assortment of goods. There are in addition two other supply stores and first-class hotels, two wagon and blacksmith shops, two livery stables, a schoolhouse, a wholesale and retail butchering establishment, four saloons, drug store, town hall, etc., that go to the make-up of a first-class country town. Large quantities of crude borax are daily shipped from this point, the product of the celebrated mines of Coleman & Co., in the Calico mountains, 12 miles northerly from the railroad. Between this place and the Needles, on the Colorado river, there are 17 stations or section-houses on the line of the A. & P. R. R., but as trade centers they are of little importance.

Calico

Is situated in the Calico range of mountains seven miles in a northerly direction from Daggett. It has a population of 300. The discovery of silver in 1881 attracted a crowd of prospectors and adventurers. Its growth, however, at first was slow, as but little confidence was placed in the permanence of the mines and stability of the camp. The ores, though rich, free-milling and in abundance, were believed by many to be blanket ledges that did not "go to the deep." The work of development was done with that understanding, but soon confidence was restored by deeper explorations and the ores found in place and in vein-shaped fissures. In 1882, the town rapidly increased in size and population. Corner lots were in demand; business buildings and residences were erected with the usual accompaniments of all frontier prosperous mining towns. The population at that time numbered 800 to 1000.

Fortunes were realized and as rapidly lost. The fire fiend since that has attacked the town several times. The last fire of importance occurred in 1888, leaving the Calico a black smoking mass of ruins. It is now being rebuilt in a more substantial manner. The material in use is a natural cement and coarse rock forming a grit that is found in the vicinity, rendering it perfectly fire-proof. Cut stone is also used for fronts. Judge Walsh, Ex-Governor John Daggett, W. H. Stow, Dr. A. R. Rhea, Robert Gribben, J. W. Gashwiler, H. B. Stevens, H. R. Gregory, Col. H. H. Markham, William Raymond, John S. Doe and others were, in its days of prosperity, identified with its interests and many of them still remain. It is estimated that during the past nine years the yield of the mines of Calico Mountain has been at least $10,000,000, and it is still largely productive. A noted feature of this camp is that capital has never lent a helping hand. The mines have paid for their own development with large surplus as dividends.

The town at date contains five general merchandise and variety stores, four saloons, three lodging-houses, three livery stables.

Bagdad

Is a station on the line of the Atlantic & Pacific R. R , and contains a population of about 50 with a surrounding country rich in mineral wealth. The ores of gold, silver and copper abound, but the absence of water and the lack of fuel prevents developments.

Needles

Is directly tributary to California for its supplies. Being situated on the banks of the Colorado river, it is doubly favored by not only having the advantages of water transportation by a regular line of steamers on the Colorado river but railroad facilities as well. The Atlantic & Pacific railroad of the Atchison, Topeka & Santa Fe system passes through this town, and since its completion it has had a rapid growth. The population at date numbers over 600 souls. It contains several public buildings, church, schoolhouse, public hall, six variety and one merchandise store, residences and last but not least, a weekly newspaper edited and published by its proprietor, Dr. J. P. Booth. An extensive area of valuable mineral country is tributary to this town. In a westerly direction large bodies of low-grade silver-lead ores in the form of carbonates and oxides abound; while a strip several miles in width and 40 miles in length bordering the river is rich in silver and gold, on which several mineral districts have been formed. The town is destined at no distant day to be a place of considerable importance. Messrs. Monahan & Murphy are the leading spirits of the town, and have contributed largely to its growth.

(To be Continued.)

THE NORTH BLOOMFIELD MINING CO. has given notice of intention to enjoin the Sheriff's sale of its property on the judgment obtained by the county of Yuba against it for the nonpayment of a fine imposed upon the company for violating an injunction to restrain it from mining by the hydraulic process. The company contends that its property cannot be sold under a judgment obtained in that manner.

PASTEUR'S TREATMENT.—In the past three years Pasteur treated 7893 persons bitten by mad dogs and only 53 died. The usual percentage of deaths is 15 90, so that Pasteur would seem to have saved 1265 lives.

THE United States Branch Mint, in this city, is again open for the receipt of bullion, the annual settlement having been made.

A LEDGE showing a little gold has been found in Murray township, Alameda county.

THE Drum Lummon mine, Montana, is making a profit of about $40,000 a month.

San Bernardino County.

Its Mineral and Other Resources.

NUMBER IV.

[Written for the Press by JAMES H. CROSSMAN.]

Mountain Ranges

After leaving the main Sierra Nevada range at Tehachepi the San Gabriel appears, a high mountain range extending southerly to Los Angeles and Pasadena. Its course is easterly and westerly. Its dominant peak is known as the San Antonio, rising to a hight of 9630 feet above the level of the sea. The San Bernardino range proper, commences where the San Gabriel ends. From this point its strike is south 34 east, and terminating at a point in the vicinity of and opposite Yuma, on the Colorado river. San Bernardino mountains contain several prominent and noted peaks. San Bernardino peak forms the initial point of the U. S. land surveys, at an elevation several hundred feet lower than its summit. San Jacinto peak, situated south of San Gorgonio pass, rises to a hight of 10,920 feet, forming a prominent land-mark, visible from almost any point in the desert region.

Desert Mountains.

That portion of San Bernardino county lying north of the San Bernardino and the San Gabriel ranges of mountains is known as the desert region, which is dotted with short ranges, low buttes and isolated peaks. That mountain known as the Providence range is the most important and of the greatest longitudinal extent. This with Kingston mountain and the Yellow Pine, constitute the principal ranges of this region. Combined, the mountain portion of the desert covers but 5825 square miles of the entire area of 17,476 square miles of mountainous country.

Geology.

The core or axis of the San Bernardino range of mountains is granitic, varying in character and composition from syenite to gneiss and mica schists, with quartzite dykes and lime belts of great width, strength and longitudinal extent. Some of the rocky structure has been highly metamorphosed; hornblendic slates and magnesian rocks also occur. In many places on the northerly slope of the San Bernardino range of mountains unaltered sandstones are seen in immense quantities, particularly in the vicinity of Holcomb valley, in the Black Hawk, which is a spur of the main range.

On the southerly flank of this range bodies of sandstone are seen dipping at varying angles. On the northerly flank of the San Gabriel and San Bernardino ranges an important belt of limestone occurs of great width and extent. This belt is traceable from San Antonio peak southeasterly through Holcomb valley to Twenty-nine Palms; thence on its line of strike appearing and disappearing as far as the Colorado river, and possibly extending into Arizona. Its width varies from four to ten miles with occasional spots and dykes of syenitic rocks and micaceous schist, trape, porphyries and strata of magnesian and talcose slates. This belt of limestone is not uniform in character. It often changes from a dark-blue mountain limestone to a carbonate of a dazzling whiteness (marble) varying in texture, color and crystallization from that of a yellowish dolomitic magnesian limestone, but still marble. On either the northerly or southerly border of the belt near the contact of granite and mica schist it is invariably metalliferous to a greater or lesser extent, and cuts an important figure in the metallic domain of this county. The border metals are, however, as a rule, dissimilar in character. The ores of lead and silver occur at and near the southerly contact, while on the northerly line of demarcation the veins carry gold in paying quantities. The Black Hawk mines are a notable instance of the latter feature. The prospector can here find a virgin field in which to show his skill and test his luck by following the line of contact denoted. This metalliferous belt, both east and west of Cushenbury has been but little prospected. The indefatigable and old-time prospector, O. G. Leach, is the only one that I have ever talked with that seemed to understand the situation.

Slover Mountain

Is an isolated peak or lone butte of insignificant proportion, but of great commercial value as a producer of marble and lime. It lies three-quarters of a mile southwest of the town of Colton. Its dimensions are three-quarters of a mile in length from north to south by half a mile in width, and it reaches an elevation of 700 feet above the level of the sea. We cross the San Bernardino range or Cajon Pass and into

The Desert Region.

The Ord mountain range, inclusive of the Lava Bed range, which is a southeasterly prolongation, has its greatest elevation at 6500 feet in Eagle Peak. It is situated in the Mojave desert, about 50 miles northerly from San Bernardino, and is about 30 miles in length by from four to six miles in width, with a northwesterly and southeasterly strike. The Lava Bed mountain is a prolongation of this range in a southeasterly direction, only divided by a low pass. On its northerly flank the remains of an extinct crater (volcanic vent) are seen with its cup-shape depressions from which at no remote period immense quantities of molten lava were ejected. This mountain range attains its greatest elevation at Eagle Peak, a prominent land-mark and feature in the landscape visible from almost any elevated point in the desert region.

This section for many miles, in every direction from Ord mountain, contains almost every known formation, aqueous rocks predominating. In the northwesterly extremity of Ord mountain, a massive quartzite dyke appears coursing with the formation and dipping 70 degrees northerly from the vertical. The axis of the range is granite. On either side of the dyke referred to, we found metalliferous veins of quartz of great strength and persistence carrying metallic gold and the ores of copper of unusual richness. The mountain at this point is composed of metamorphic rock, porphyries, granites, magnesian and talcose slates. Eruptive dykes of trap with other varieties of igneous rocks evidence subterranean heat, as previously stated.

The Lava Bed Range

Is a southeasterly prolongation of the Ord. Its course is north 22 degrees east; its dominant peak (Clark's) rises to an elevation of 4500 feet and is located 26 miles easterly from Daggett (in an air line). Its axis is granitic, but so much changed and metamorphosed from the effects of subterranean heat, the evolution of powerful gases and thermal water that it is scarcely recognizable, it being in the immediate vicinity of several prominent volcanic vents which are situated from 4 to 5 miles distant in an easterly direction and has felt their effects. This mountain is traversed by fissures whose strike is 70 degrees west of north. These fissures in the earth's crust have been filled with quartz and a brecciated mass of broken angular fragments of many varieties of rocks which have been ejected by dynamic forces from subterranean depths.

A noticeable feature, however, is that the edges and angles of these fragmentary rocks are sharp and charged, as a rule, with a sufficient quantity of the oxides of iron and manganese (which is disseminated through the mass) to give it a brown black or reddish tinge. Wherever quartz fills the fissure it is invariably found rich, carrying the ores of gold, silver and lead. These vein dykes rise boldly from 10 to 50 feet in hight and form marked features in the landscape which are visible for many miles as their black lines cut the lighter colored formation of the mountain's slope. To all appearances these fissures were at a period anterior to the comparatively recent volcanic disturbance, filled with quartz but subsequently reopened, and their integrity as quartz veins destroyed and shattered by the ejection of a broken mass of the rocky structure through the powerful effects of volcanic action.

Victor Mountain

Is two miles long by one in width, with a northerly and southerly trend. It is 700 feet high, and composed of a close-grained, homogeneous granite, forming the two valuable granite quarries that are being worked in the vicinity of the town of Victor. On the northerly end an extensive lime belt occurs of one mile in width, with an easterly strike, and a longitudinal extent of 12 miles, in which there are veins of quartz carrying the ores of copper, gold, silver and lead. To all appearances, Victor mountain at one time formed the northerly rim of either a river channel, prolongation of the Gulf of California or an extensive lake similar to that of Salt Lake in Utah. Either or all of these theories are tenable and possible. The geological structure of the country goes to prove that many changes have taken place in the topographical features of that portion of the North American continent that lies West of the Rockies. Upheavals and depressions of the earth's crust have repeatedly taken place.

Leaving Cajon Pass, at an elevation of 4676 feet, passing northerly through Hesperia, with her forests of cactus (yucca), we descend into the valley, following nearly on the line of the Mojave river. Victor mountain apparently forms a barrier to the further progress of both train and river, there being no visible outlet. But as we approach the mountain, a narrow gorge is seen barely wide enough to admit our passage, its walls rising sharply to a hight of several hundred feet, through which both river and train enter and pass. We now enter the Mojave desert proper, with its broad acres of barren, sandy, alkaline flats dotted with short ranges and isolated peaks raising their heads above the surrounding plains. A photograph from some elevated point, as for instance from a balloon at a considerable hight, would show a bird's-eye view of what would appear to be an immense sea dotted with numerous islands.

The Oro Grande Mountain,

Whose greatest elevation is 3925 feet, forms the easterly boundary of the Mojave river. It is 10 miles long by 5 in width at its widest point, coursing northerly and southerly. Its stratification is northeast and southwest and largely composed of volcanic eruptive material, porphyry, volcanic debris and a cemented brecciated mass of angular fragments of rock evidently ejected, through which courses dykes of trap porphyry and veins of metalliferous quartz, carrying the ores of gold, silver, lead and copper. These fissures undoubtedly occurred at a period subsequent to the formation of the mountain. On the easterly flank and in the vicinity of the river, a broad belt of a nearly pure blue limestone occurs which is extensively used for manufacturing lime. Several kilns are in constant operation in the vicinity of a town bearing the name of the mountain which is situated on the bank of the Mojave river.

Calico Mountain

Is situated 80 miles northerly from San Bernardino. Its highest peak is 2975 feet above the level of the sea. It is 12 miles in length by from 3 to 4 in width. Its strike is north 40 west. The nearest town and railroad connection is seven miles southerly at Daggett. This mountain is known as the Comstock of the desert, from its large output of silver in the past and large reserve in store in the future, rendering it to the capitalistic miner an objective point of great interest for its mineral wealth. To the student and scientist it is an unsealed book, but one of great interest and no less instructive. Its pages have been thrown open and lay exposed to the investigation of the diligent observer and scientific inquirer. Its geological features are simple and easily read. The mountain *per se* consists of an eruptive mass of liparite (porphyritic rhyolite) colored and stained in various hues by the oxides of iron in combination with other minerals. These parti-colored rocks and earth were the origin of its name. There have evidently been a series of eruptions (certainly not less than three) following each other at long intervals—as man understands time—but in very brief periods and in rapid succession, geologically speaking. The first ejected from its deep-seated center the immense beds of tufaceous material that is seen on the surface stained with the various colors of the rainbow decidedly pronounced—from a dazzling white to a jet black; from a cerulean hue to a rosy red, changing to a golden yellow. This strange combination of colors was caused, doubtless, by powerful gases and thermal water that were evolved from cracks and fissures in the earth's crust acting on the metallic contents of the mass. These were the resultant effects of the first volcanic eruption.

Volcanic Periods.

The second of note was not less violent or less destructive. It deposited the enormous masses of brecciated and cemented material, forming a cryolitic paste that covers in places to a considerable depth a large portion of this isolated mountain. Calico mountain was evidently the center of disturbance. Lateral volcanic cones of lesser importance are seen at varying distances of from four to eight miles in the vicinity. This class of volcanoes are known as water volcanoes, ejecting water, mud and broken fragments of rock instead of fire and molten lava. Four miles in a southerly direction in the vicinity of the town of Daggett, a massive outburst has taken place. An oblong hill 250 feet in hight and 1000 feet in length is entirely formed of this volcanic material. At its base we find the Waterloo mill of 60 stamps. At a date contemporaneous with and anterior to this volcanic outburst, that whole country now known as the desert was evidently covered by an inland sea of saline water of considerable depth—in all probability an arm of the Gulf of California. This is evidenced by the saline and alkaline deposits of borax, soda, salt, etc., that are found in such immense quantities in the desert region. A lapse of time occurred and disintegration of the newly formed pasty and rocky structure rapidly ensued, and our newly formed mountain lost its integrity.

Its detritus, through gravity, atmospheric influences and the erosive action of water, sought lower levels. The land encroached on the sea and lakes were formed which, together with the detritus from the surrounding mountains, assisted by the powerful action of the sun evaporated the waters and soon filled the lake beds. The desert became a barren, desolate waste of sand. It must be understood that it was not Calico mountain alone and its vicinity that felt the effect of these forces, but all that territory that lies west of the Colorado river and north of the San Bernardino range of mountains. The zone, belt or line of disturbance took an easterly and westerly course and extended northerly, penetrating the State of Nevada for many miles.

At a Later Epoch

The "fire fiend" again came to the front; he had only been sleeping; his fires had not been extinguished; his strength was renewed and with a fresh accumulation of carbonaceous material he fired up his furnace and turned on steam and Calico mountain once more was in active operation, belching forth torrents and oceans of water with mountains of mud and rock. This powerful and continued blast had had its effect. The rocky structure was in a state of fluidity. The furnace was tapped and other vents thrown open from which poured forth a molten mass.

The whole country was in a blaze of fire. Semi fluid lava in immense quantities on descending grades followed low depressions and beds of streams, filling the beds of the few remaining lakes. It was a contest between fire and water, and fire obtained the ascendancy. The cast was made and the face of mother earth was covered with a sheet of scoria and lava. The rocky structure in every direction was in a plastic and semi-molten state, sedimentary beds and stratified rocks are seen folded and crumpled into every conceivable shape without a break or flaw.

The westerly banks of Wall St. canyon of the Calico mountain presents a marked illustration of the powerful forces then at work.

Evidently, at a still later period, after a cycle of rest, the fires were again rekindled and again burst forth. At this period the ejected rocky mass was largely composed of felsite, adding another variety of volcanic debris to the already accumulated mass of eruptive matter.

This, apparently, was the third and last attempt of the fire-fiend. We trust that the effects of his last efforts may have sent him to that bourne from whence "no traveler returns" and that he may have been cremated in the furnace of his own construction. If so, "peace to his ashes."

(*To be Continued.*)

A Grand Redwood Reservation.

Our readers will be pleased to learn of the progress of Col. J. B. Armstrong's plan to donate a grand area of redwood forest in Sonoma county to the people of California as a perpetual reservation. Col. Armstrong has been a devoted lover of nature always and an earnest advocate of rural improvement which aims to "hold the mirror up to nature," and thus to do away as far as possible with the aspects of the cultivated country, which are almost a desecration of natural beauty. This spirit, of course, manifests itself in many ways, and one feature of its work lies in the effort to reserve certain representative areas of nature's grand work from the ax of the lumberman or settler. This is sometimes accomplished by the Government, sometimes by individual grant, and in some respects at least, the latter method is better, because the grantor being of necessity a nature lover can so place his gift that it shall be beyond the control of those with mercenary motives or those who have no love nor taste for such matters. Government grants or property granted to public use under Government control are very apt to suffer from mismanagement or sacrifice.

Col. Armstrong having prospered in this State of his adoption, now proposes to make a grand gift to the people of California and to place it in such hands that it shall always remain true to nature and true to its beneficent mission. We find in the Santa Rosa *Democrat* an outline of Col. Armstrong's plan, which may not be accurate in all particulars, but it gives outlines of the plan:

"Col. J. B. Armstrong proposes a reservation of a park of 600 acres near the end of the Guerneville branch of the S. F. & N. P. railway, in Big Bottom. Four hundred acres of it are covered with the natural virgin growth of redwood, laurel and other sorts of timber, some of the trees of great size and beauty, from five to 15 feet in diameter, and exceeding 300 feet in hight. It is the last large tract of redwoods on Russian river that is a fair specimen of the great forest once covering its banks in a state of nature.

We understand that it is to be conveyed to trustees, in perpetuity, for the people, under few restrictions, together with an endowment sufficient for the annual income to improve the grounds with drives, ornamental buildings, gateways, porter's lodge, etc. Two hundred acres, being improved with orchards, buildings and the like, are to be made productive so as to yield an annual income toward developing the park, and will afford a suitable site for growing flowers and plants under glass for planting along roadsides and filling vacant places under the direction of a landscape gardener, as time rolls on. For it is not for a day, but for all time. Fifty years hence, when these forests are a memory of the past, the gift will be appreciated. Colonel Armstrong proposes to retain control so long as living, but will begin and complete many improvements, with due regard to preserving the natural features of the forest. One of the restrictions will be a positive prohibition against destroying the timber, or even trimming the trees. The drives and paths will be made throughout so as to bring into view the beauties of the place, and water will be introduced in fountains at various points. The grounds are flanked by the foothills of Mt. Jackson, protecting the big trees from the winds, and there is no reason, except fire, why, with care, the park should not stand for all time."

Such a grand act as the rescuing of such piece of forest land from spoliation and the perpetual devotion of it to public instruction and recreation, should yield the donor much satisfaction in consciousness of well-doing. It will, of course, perpetuate the memory of the donor among men, but that to a man of Col. Armstrong's retiring disposition, is probably the smallest consideration involved. To preserve the trees he loves for the improvement, elevation and enjoyment of mankind, for whose ennobling he has always worked with voice and pen and purse—this is the grand central thought in the project, the realization of which we trust the donor may live many years to direct and enjoy.

SOLD A MINE.—Hans Bender, an indefatigable prospector, has sold an antimony mine in the mountains south of Sacramento canyon to an Eastern company, who will commence shipping ore forthwith. The ore is said to be worth $90 per ton in San Francisco.—*Silver State.*

SAWMILL BURNED.—The steam sawmill belonging to Johnson & Palmer, together with 40,000 feet of clear lumber and about 95,000 feet of rough lumber was totally destroyed by fire last week.—*Adin (Modoc Co.) Argus.*

CORRESPONDENCE

We admit, unindorsed, opinions of correspondents.—EDS.

The Gold Belt of Northern California.

Ancient River Channels and Gravel Deposits.

NUMBER IX

[Written for the MINING AND SCIENTIFIC PRESS by JAMES F. TALBOTT, Blue Canyon, Placer Co.]

Coarse Gold.

At Shady Run in the old Blue Bluff claims, a lead of coarse gold in spots has been followed several hundred feet back into the flat; nuggets weighing from 1 ounce to 20 and 30 ounces have been found in this lead. To the east of this flat or basin is a narrow outlet into Blue canyon. From this point down the canyon a mile or two, some extremely rich crevices were found, containing coarse gold of the same kind as that on the hill. At about a certain distance down the canyon the coarse gold gives out, and as in other places the richness diminishes. The canyon presents the same appearance for several miles above, but no pay has ever been found above this outlet.

The same conditons are observed on the Nevada ridge. From a rich deposit in Bear river, at the mouth of a small ravine, the pay was followed up the ravine into a richer deposit in the hill at Little York. The first discovery of hill diggings in California was at Nevada City, where the pay in a rich ravine was followed from Deer creek up into the richest and most extensive deposit of this character ever found in California or any other place—the famous "Old Coyote" lead. A peculiarity observed in regard to those

Rich Shallow Deposits

On the hills is that they invariably face to the south or west. This is accounted for from the general slope of the country being in that direction, thereby giving free outlet; while a break, with an outlet to the east or north, is running against the elevation of the country in these directions and is soon blocked up; hence no extensive or rich deposits are found in these directions from the source; whereas, to the south and west the outlets are unobstructed, and the gold is concentrated in those places, under the conditions previously indicated.

In some localities very rich small deposits have been found, where no trace of the source can be observed. We can account for this from the fact that the immense deposit of lava, immediately overlying the main river-beds, and its solid indestructible character has resisted the action of modern erosion, while the greater portion of their lateral tributaries and canyons, being free of lava, have been swept away and entirely obliterated, and a portion of the gold that was in them has been deposited in these isolated spots, where no traces of its source have been left.

In some localities in the upper part of the gold belt some considerable sections of those tributaries still remain. On the Middle Fork Divide several are observed, as at Deadwood, Last Chance and other points. But as this is near the line of the main lava flow, the most of them are capped with lava.

On the southern slope of the North Fork Divide is one of note and considerable extent at Lost Camp. This is an isolated section, situated about three miles a little north of east from Shady Run, and a mile and a half directly south from the town of Blue Canyon. It is about three-quarters of a mile in length, running east and west through a low sag in the ridge between the north branch of the North Fork and Blue Canyon, and is abruptly cut off at either end by a deep gorge. Between it and the Shady Run lava-capped ridge to the north, a high range of bedrock country intervenes, south of which no trace of lava is seen. On the south, toward the North Fork, is a high rimrock. Immediately to the east the deep canyons and branches of the North Fork have swept the entire channel away for several miles in that direction, and apparently to near its source in the vicinity of Monumental, Barnett and Wilmet canyons, where considerable gravel deposits still remain. The upper portion of the channel in this section is considerably broken up, and the bottom deposit somewhat irregular. The top formation is an irregular mass of material from the surrounding country, composed chiefly of float quartz and bedrock but slightly worn, intermixed throughout with a body of light yellow clay. This is evidently from

An Immense Slide

Coming from the high bedrock range to the northeast, which probably blocked up the channel here and prevented this section from being carried away. At the lower or west end, from where it breaks off into Blue canyon, the channel is about 50 feet wide and well defined. The bedrock is hard and water-worn on the high points and pot-holes. The bottom stratum, in which the pay is found, is a solid compact body of gravel and bowlders from 5 to 10 feet in depth, principally quartz. The top formation is about the same as that at the east end, only more worn and rounded, with less clay in it, and is evidently a wash from the slide above, which has filled in above the bottom deposit to the depth of 50 feet and carried the lighter material on to the south rim a quarter of a mile beyond, where, on the bedrock points, a few feet in depth, a barren deposit of fine gravel intermixed with the yellow clay, is left.

An Isolated Section of Channel.

Here then, is an isolated section of a small well-defined channel, which unmistakably belonged to the ancient system. To the east an apparent connection can be made with gravel deposits indicating its source, but in no other direction can a vestige of the channel be discovered. To the north and northeast is a high bedrock country—on the south a high rim and two high bedrock ridges intervene between it and the Middle Fork Divide. To the west is the high rim of the channel in the Shady Run ridge, heretofore described.

The only course possible for it, then, is to the southwest—the natural course of all, ancient and modern. The natural conclusion is that this one-time channel, free from lava, ran about parallel with that in the Shady Run ridge, down to or below Bogus Point, where it formed a junction with the main one, and that the floods from the combined displaced waters of both divides rushed into this tributary and carried every trace of its existence away as far up as Lost Camp, cutting out the deep gorge of Blue canyon and other branches of the North Fork, when all of the forces were united and cut out the famous gorge of Giant's Gap, and below Bogus Point swept away every vestige of the main ancient channel of the North Fork divide.

Relations Between Different Localities

This is a wide and deep subject, and most all of the articles heretofore written in regard to it appear to have been by some casual writer, visiting the rich and well-developed localities, unacquainted with the general character of the surrounding country and the existing relations between different localities. As a consequence those articles only reflect the narrow views of certain individuals, whose observations for the past twenty years, probably, have not extended beyond the vision of the principal saloons of the place, and who see in the deep gravel deposit of their locality, the main ancient river channel—the "Hub" of all the mines in the country, particularly if there is "blue gravel" in it.

It is not intended in this article to give any new information in regard to the mines on the Middle Fork Divide, but, for the purpose of comparison, to call attention to certain facts and to certain conditions observed on the surface that indicate to a degree of certainty the conditions of the underlying formation, which is practically demonstrated here by actual workings. Those surface indications have heretofore been outlined to some extent, and the underlying formation is brought into full view by extensive developments. The mud (cement) and lava flow inside the rim-rock walls has been traced on the surface for a long distance in a definite course, and, at different points, many miles apart. On this course deep shafts have been sunk and long tunnels have been run through the rim-rock, and the underlying formation of bowlders and gravel are found, containing the rich deposits of gold. Only where breaks occur through the rim to a certain depth are extensive and rich gravel deposits found outside the rim.

(To be Continued.)

The Accident at Hayden Hill Mines.

EDITORS PRESS:—A fearful accident happened at the Hayden Hill mines on July 24th, when two men lost their lives in the Eclipse mine.

Frank Auble and William Dunbar were down in their mine working, when a fire broke out in the buildings over the shaft. The fire is supposed to have started in the blacksmith shop close to the whim house. The house over the shaft taking fire, gave the men in the mine no possible chance for escape.

There being no one on the surface to give the alarm, the buildings were nearly consumed before being discovered by other miners on the Hill. The fire was soon extinguished after being discovered, but had meantime burned down the shaft the depth of two sets of timbers.

After the fire was extinguished, men were let down the shaft to learn the fate of Auble and Dunbar, but none could stand the suffocating atmosphere. Mr. L Richie was the first to be let down the shaft and had to be hoisted up, being nearly suffocated.

About 8 P. M. word was telephoned to Mr. Charles Auble at Adin, brother of Frank Auble, and he immediately started for the Hill. Word was also sent to another brother, G. Auble, who resides seven miles from Adin.

Every attempt to enter the mines was fruitless until the next day, July 25th, when two of the Auble brothers succeeded in getting down to the 40 foot level. There in the drift about 60 feet from the main shaft were found the two dead miners. Mr. G. Auble being a man of courage, he succeeded in getting the lifeless remains out of the mine with the help of others. Both men belonged to the Odd Fellows' Society and were buried by the Order. There was a large procession of sympathizing friends. Mr. William Dunbar leaves a widow and two small children to mourn his sad fate. Mr. Auble leaves two children, his wife having died some years ago.

Both men have many sympathizing friends here.

H. KELLEY.

Adin, Modoc Co., July 26, 1890.

San Bernardino County.

Its Mineral and Other Resources.

NUMBER V.

[Written for the PRESS by JAMES H. CROSSMAN.]

Calico Mountain

Calico mountain contains a species of coarse granite; hornblende and andesite also occur, but the nomenclature of these rocks, their origin or mode of occurrence does not interest the prospector, miner, or mine proprietor. He only seeks to know the size of the vein, the assay value of the ore and its character, whether free or base, copper, gold or silver. He wants to know if it goes to the deep and that the pay chute has sufficient longitudinal proportions. The answer satisfactory, the miner is content.

To the geologist and student, mineralogist and metallurgist, Calico mountain is a field of great interest. He can find here not only a great many varieties of rock, but evidences of intense volcanic activity, and many of the ores of silver, gold, copper and iron. He can also find typical specimens of all classes of veins known to exist. It is a free and open school for the student in which to take lessons in practical mining and milling preferable to either Freiburg or Berlin. There he can only obtain a theoretical knowledge of the art, but in Calico he combines theory with practice. Let him win his spurs and diploma from the rocky structure of some one of the many deep-seated fissures that abound in this region; learn the length of the chimney or chutes of ore; learn the difference between a "fissure" vein, a "blanket deposit," or a "gash" vein; learn how to pitch his hole in order to throw the most rock for a given amount of explosive material; learn the use of the tools of the craft, how to make a survey and an assay, how to manipulate the machinery in use. Then let him go to the mill and reduction works and learn the secrets of the millman's art. He will be then better qualified to judge of the character of a mineral vein or deposits than many who have graduated with all the honors and received their diplomas from the professors of the celebrated mining colleges of Germany and elsewhere. At least he will know the difference between a "true fissure vein" and a "crack." The latter term has been used by one of our prominent mining and scientific lights in his pronounced classification of all of the mineral-bearing veins that occur in the Calico mountain, which, to use his own classical expression, he dubs as "cracks."

In this connection I would state that it is not my object or intention to decry science or scientific attainments that have been acquired in the celebrated schools referred to, but theoretical knowledge without practical work in the field is of but little benefit.

The Ore-Bearing Material

That forms the gangue of the Calico veins consists principally of heavy spar, quartz, tufa, sandstone and indurated mud, the latter evidently ejected from some deep-seated source as a volcanic product, and often found rich in the ores of silver.

The most notable, extensively worked and best defined veins on the Calico mountain are the King and Waterloo. They carry smooth and well-defined incasing walls showing "slickensides" (gouge) for long distances. Several of the veins on Calico mountain cut the formation at varying angles and so far as exploited, show no signs of weakening as "they go to the deep." Certainly no surface crack or superficial deposits could have produced these results. If these general characteristics do not constitute a "true fissure," not a "crack," my 42 years' experience from Cerro Pasco, Peru, to the Comstock of Virginia City, goes for naught. On the northerly flank of the Calico mountain an important and interesting bed or measure of crystalline borates occur, known as "colmanite," of an unusual high tenor in its boracic product. This seam or measure carries transparent crystals of extraordinary beauty and in great quantities. They are sought for and highly prized by all of the scientific institutions in the world. This mine is being extensively worked and its product daily shipped to San Francisco via Daggett for refining. Details of not only this but of other mines in the county will be described later under their appropriate head.

Avawatz Mountain.

Course northwesterly and southeasterly, 25 miles in length by 20 wide. Its greatest elevation is 6500 feet, aneroid reading. This mountain is situated about 60 miles in an air line nearly due north from Calico. The formation, mineralogical structure and character of its ores resemble in a marked degree those of the Ord Mountain which I have previously described. Kaolin and foliated talc are found in great abundance. Near the summit of the highest peaks veins of gold, silver, copper and lead occur. About 30 miles northeasterly from Cave Wells, which are located about 2½ miles easterly from the summit of the Avawatz range on the road leading from Daggett to the Amagosa Borax works and Resting Springs mine, a high, gloomy, desolate range of mountains is seen, known as the

Kingston Range.

This is the first range of mountains encountered after crossing the southerly rim of the Death Valley basin. It is marked by high and almost vertical peaks—the highest of which is Kingston Peak, which is 8000 feet above the level of the sea and forms a prominent landmark. The range, peak and spring at its base derive their names from a man by the name of Kingston who formerly had a contract for and carried the mail between Salt Lake City and San Bernardino county, when life on the desert held an uncertain tenure, owing to Indian raids. On its northerly end large deposits of argentiferous galena occur. This mountain, including Good Spring mountain, is 12 miles long by six in width. Course due north and south. Its axis is granitic. On its westerly bank a secondary granitic rock occurs and on the east a lime belt of great strength and persistence is seen. About six miles northerly from the above named peak is a low range apparently an off-shoot from the main Kingston mountain. The extensive argentiferous lead deposits surrounding Resting Springs occur on the northerly extremity of the main range. At this point the mountain is shattered and broken until finally, losing its integrity in Ash meadows 25 miles distant, it altogether disappears. The same formation extends in a southerly direction through Good and Resting Springs.

Good Spring Mountain

Lies southeast of Kingston and in line with it. The formation is granite and a stratified limestone and a lime schist much broken by volcanic action. Metalliferous veins of quartz occur, carrying the ores of lead, silver and gold. This mountain is a prolongation of Kingston range.

Traveling in a southeasterly course from Tacopa a distance of about 40 miles, we reach

Clark Mountain.

Its course is northerly and southerly, and it is about 20 miles long by 10 wide. It reaches its greatest elevation on its southerly end, where Clark's Peak rises to a hight of 4200 feet above the level of the sea. This peak is a noticeable landmark that can be seen from almost any elevated position in the desert for a long distance. Its most northern point terminates in Nye county, Nevada. This mountain range is celebrated for its ores of silver, copper and lead—the first of extraordinary richness and known as a silver-copper glance.

East of the last-named mountain range, crossing 20 miles of a desert whose only vegetable product is the cactus and an occasional tuft of bunch-grass, we reach the

New York Range.

Its course is north and south; it is 20 miles long by from 4 to 6 in width; elevation, 2200 feet. Through this mountain there courses longitudinally important mineral-bearing veins that crop boldly, their crests exposed for long distances. The ores are of copper, silver and lead. Thence easterly for a distance of 20 miles, we reach a low mountain range that borders on and forms the westerly rim of the Colorado river, which is known as the

Colorado Range.

This range extends in a southerly direction to a point near the boundary line of San Diego. The range contains several important mineral districts, carrying the ores of gold, silver, copper and lead, particularly below The Needles. In the more northern portion of the county, adjoining the Nevada State line,

The Yellow Pine Range

Occurs. Its trend is from northwest to southeast, with Charleston Peak its highest point, reaching an elevation of 10,844 feet. This is snow-clad the most of the year, particularly so on its northerly exposure. A broad belt of lime courses longitudinally through this range which contains fossil marine shells. This mountain, at an elevation of from 4000 to 6000 feet, is covered by an important belt of pine timber which is largely owned and controlled by Mr. N. Clark, who has erected a sawmill on the belt which he utilizes whenever there is a demand for lumber. The best timbered portion of the range enters Nevada from 10 to 20 miles northeast of the California State line. This belt of timber lies principally to the east of Charleston Peak, which is distant 150 miles northeast from the town of Daggett. The range extends from Providence mountain on the south to Pahranagat valley on the north. The valley is well watered and noted for the fertility of its soil, producing large crops of all of the vegetable products of the temperate zone. It is extensively cultivated by enterprising farmers. Stock find good pasturage in the foothills of the valley.

Returning to Clark's mountain again, we travel due south for a distance of 42 miles and reach the town of Providence on the easterly flank of the central portion of

Providence Mountain.

The course or trend of this mountain is northwest and southeast. It has a greater longitudinal extent than any mountain range in San Bernardino county north of the San Bernardino range of mountains. Its extreme length, inclusive of Old Dad on the south, from which it is only divided by a low pass, and the Macedonia and New York ranges on the north (connected the entire distance by low ranges of hills), may be estimated as follows:

Old Dad, ten miles long by eight miles wide; Providence proper, 20 miles long by eight miles wide; Macedonia mountain, including a low connecting range of hills 42 miles long by four wide in its widest place; New York range, ten miles long by four wide, forming in the aggregate a mountain range 82 miles in length by from four to ten miles in width.

The central portion of this mountain is Providence proper, and contains many marked features of great interest to both miner and scientist. To the first its attractive features consist in its great store of mineral wealth, the details of which will be more fully described under the head of "Mineral Districts and their Mines." The scientist will probably be more interested in its structural formation and geological character. It is bounded on the east by an extensive valley which is from 30 to 40 miles in width and more than 100 miles in length.

Volcanic Structure.

This valley is dotted with volcanic cones that at no remote period in the world's history poured forth mud and broken rocky fragments. In the near vicinity, conical peaks, with their lava-covered flanks and basalt capped summits, form tablelands of considerable extent, and stretching away to the west, furnish evidence of the enormous mass of molten material ejected from these vents. This period of volcanic activity was, in all probability, contemporaneous with that which destroyed the integrity of Calico mountain and vicinity. Providence mountain proper, looking from the east at a point near Fenner on the line of the Atlantic & Pacific R. R., has the appearance of a sharp, serrated ridge, with vertical cliffs and steep canyons. It is composed of many varieties of rock, much metamorphosed and showing the effects of powerful heat, with dykes of eruptive rock of from 200 to 400 feet in width. The formation, however, is more regular and less disturbed than one would expect.

Ore-Bearing Veins.

Its central core is evidently granite, while on both the easterly and westerly flanks broad belts of limestone occur from two to three miles in width, usually dolomitic, alternating with bands of porphyry, secondary granite, quartzite and talcose slates, inclosing numerous strong veins of quartz and spar on their contact lines. These are persistent and course for miles uninterruptedly, forming the metalliferous domain of the district and range. The ore-bearing veins often expand into large chambers, and in places contract to a seam, but are continuous on their line of strike. A noticeable feature where expansions take place is that large feeders or spurs fall in, and at their intersection the ores are invariably rich. The writer followed this belt for a distance of eight miles without noticing a break or dislocation. This occurs at an elevation of 4000 feet above the sea level.

On the easterly flank of the mountain the ores bear silver-lead and silver in the form of a chloride, usually accompanied by zinc either as a sulphide or as an oxide. On the westerly slope of the range, from three to six miles distant at a right angle, the ores carry gold, silver and lead. The want of water and fuel seems to have been the principal obstacle in the way of making this a large and productive mining camp. To obviate this difficulty and supply this much-needed want, extensive reservoirs should be constructed at suitable places to conserve the waters that run to waste, and artesian water should be sought for in the valley. The mountain is not destitute of a limited supply of the aqueous fluid. Springs of pure limpid water gush forth from several places on the flanks.

Old Dad

Is a mountain 15 miles long and 10 wide, and on the south is the dominant peak of the Providence mountain range. Its elevation is 6300 feet above the level of the sea (aneroid readings) and in the winter months it is clad with a mantle of snow. The dividing line between it and the Providence mountain proper is a low pass through which a road leads to the interior desert region of the Death Valley country. Old Dad is situated 25 miles westerly from Danby and 40 miles from the base of Old Woman's mountain, which lies in an easterly direction. Its formation is similar to that of Providence and contains metalliferous veins of the precious metal. Its extreme southerly point is within six miles of Danby, a station on the A. & P. R. R.

The Rock Spring Range

Courses southwest and northeast and at a right angle with the Providence range, bisecting it in a northerly direction from Providence proper. It is entirely composed of granite of an older formation than any that I have seen in the desert. It contains numerous springs of water but no minerals.

The Old Woman's Mountain

Lies at an elevation of 4500 feet, in an easterly direction. Its course is northeast and southwest, 30 miles long and 20 in width. It derives its name from a pinnacle of granite that stands alone on the summit of the ridge in bold relief against the horizon. This solitary figure rises to a hight of from 30 to 40 feet, and at the distance of a few miles resembles in a marked degree the statue of an aged human being of the feminine persuasion dressed in fashionable attire.

The resemblance is so striking that the observer can scarcely believe that it is not a work of art executed by some vagrant artistic sculptor who had strayed into these desert regions and left evidences of his skill. This mountain is 30 miles in length by 20 in width. Its axis is a secondary granite with a northerly and southerly trend. The mountain is bisected by a strong belt of magnesian limestone accompanied by calcareous shale and magnesian and talcose slates which carry strong veins of quartz charged with the ores of lead and silver. In the granite adjoining the veins are small but well defined. The ores are of copper and gold. The nearest point to rail (the A. & P.) is eight miles north at Danby, to which a trail has been built to pack ores from the mines. The Clipper mountain range lies south and west of the A. & P. R. R. It is 10 miles long by five wide; its greatest elevation is 7000 feet.

Ship Mountain

Lies in a southwesterly direction from Danby, distant eight miles. Its formation is granite on the west and porphyry on its easterly flank. Lying parallel and adjoining is a belt of dolomitic limestone from 50 to 250 feet in width in which and on its line of contact, a large bed of specular iron occurs. This is the lime belt that crosses and enters the Old Woman's mountain. This mountain on its westerly flank shows evidence of volcanic activity; a number of large mud cones are seen at its base.

Sheep Mountain,

As seen in the distance, is one of considerable length, but rising to no great hight. It lies parallel with the course of the Atlantic & Pacific railroad, forming the southerly rim of that portion of the desert region through which the road passes. It is reported to contain metalliferous veins.

Iron Mountain

Courses easterly and westerly, and is ten miles long by 3½ wide. It is nearly due south from Old Woman's mountain, 57 miles southeast from Danby and 42 miles westerly from the Colorado river. It contains gold, iron, and an immense deposit of copper. The latter is reported to be of a high tenor, assaying 38 per cent copper, and from $20 to $75 gold per ton.

In writing the foregoing articles on the mountain ranges of the desert regions, the writer has confined himself as closely as possible to the geological features of the several mountain ranges, with but little reference to its detailed mineralogical character which will be presented under the head of "Mineral Districts." That the desert region contains immense stores of mineral wealth no intelligent man who has visited these sections can question. Want of cheap transportation, fuel, which the railroad can supply, water, which can be drawn from subterranean sources by the assistance of artesian wells and artificial reservoirs to conserve the water that falls from the heavens, have hitherto been the drawbacks that prevented the full development of this region.

(*To be Continued.*)

Mines and Mills of Shasta County.

NUMBER VII.

[From Our Traveling Correspondent.]

Extensive Reduction Works of the Calumet Co.

As stated in my last, the Calumet Co. owns on the same line of lode of the Walkers. This company has 3433 feet, embracing the Grand Prize, Wedge and Washington mines. The lode runs in a northerly direction, crops boldly, and is from 4 to 10 feet wide. The whole line of croppings is heavily sulphureted. In milling, it gives from one to two per cent, so there is no end to sulphurets that will average $100 per ton, I would judge. The rock carries free gold as well. A large amount of work has been done on the three several mines in way of shafts, tunnels, stopes, etc., and yet the depth reached is not 150 feet. Hoisting machinery is now on the ground for erection.

Ore dumps, having near by the terminus of a tram road, receive ore from the several mines. At the southern end of the claims a tunnel has been started on the lode, which is now in some 200 feet, and which it is proposed to continue for the entire length of the claims, which, continued, would come out into daylight on the opposite side of the mountain in about one mile. At the mouth of this tunnel is another branch of the railroad, which leads to the mill, a distance of about three miles.

The ore is transferred to mill by mule-power, but the company expect to put down in the near future a T rail and place thereon an electric motor. On the line of this road, which has a regular grade, there are a number of trestles over which the mule travels unconcerned, the highest being 52 feet. To the south of the mines above referred to, the company owns several other properties which are being worked, one of which—the Poorman—has hoisting works already on. This is a smaller mine, but richer, the lode being from two to four feet in width.

Following the road down, we soon take in a fine view, including the Sacramento river, surrounding hills, valleys and the fine grounds and mills of the Calumet Co. The road terminates some 60 feet above the mill, where the ore is dumped into chutes.

These works being the largest and finest in Northern California, we set ourselves down for giving an extended review of them.

The mill-site is certainly the finest, most elaborately laid out one, not only in California, but of all the mining States we have traveled in. One does not comprehend, until he is on the spot, how systematic, practical, novel, useful, and complete every part is.

The mill-site consists of 20 acres patented ground, and is situated six miles above Redding in this same Old Diggings Mining District, on the east bank of the Sacramento river, and within a stone's throw of the California & Oregon railroad, which is on the opposite side. The ground rises gently from the river, having moderately high hills in the background. The place originally was an Indian rancherea, then the locale of the placer miner; now four mills and one furnace with fine grounds have taken their place. The regular crushing works consist of 2 Paul 12 stamp circular batteries, making 24 all told; these have a reducing capacity of 40 tons per 24 hours.

These mills have attached to them a full complement of silver plates and a new oscillating blanket concentrator. There is also 60 feet of the Robbins riffle. The plan of working is:

1st. Crushing the ore by a Blake breaker.

2d. Stamping to No. 8 screen. They amalgamate in the battery. The pulp flows over a large surface of silver plates, then on to the oscillating blankets, which are used mainly for taking up the gold, and will not amalgamate; also sulphurets. Then comes the Robbins riffle, where more or less sulphurets are also saved; the pulp, relieved of the sulphurets, passes on to the "Americanized" arastras (which have stone bottoms and drags). The tailings, as we will now call them, are worked on "arastra" fashion; silver plates are so arranged that no pulp passes off without passing over them. The arrangement is very complete and practical. There are four of these arastras, which we should state are also a Paul invention; each battery has the same complement of machinery.

Every millman will say that this is very thorough working, and yet they have a loss, which makes the stamps, with the use of water, compared with the results of their dry working, unsatisfactory. We were told there was so much difference, after the best work that could be given by battery working, as to make it likely they would stop the stamps altogether, excepting when they would work low-grade ore, simply for concentrating the sulphurets it might contain. This assertion made us look at the dry mills with greater interest. There are two of these mills some 500 feet apart. We neglected to say to start with, that all the works are run by water-power, the source of the water being about 8 miles from the mills. The water-right covers about 3000 inches, but for the most of the year there is not over 500 inches available, and this falls to about 200 inches in the last month of the hot season; still, having 250 feet head, they have a vast power at command and more than they now utilize. The water-wheel used is of the Knight pattern; they also use the Knight hydraulic gate, by which a boy can start or shut off all the machinery with the greatest ease. To bring this water from its source there is, with the ditch and flumes, some 2000 feet of 3 feet diameter iron pipe, for carrying the water from the top of one hill to the top of another. All the ditches, flumes and pipes are on the west side of the river, and terminate at an elevation some 250 feet above the point required for use. All water not actually required for use is turned down into the Sacramento, while the amount required is conveyed through another gate to the pipes that lead to the works.

At the terminus of the ditch commences a line of pipe down the hill, and this gives a pressure of about 200 feet perpendicular. The works being on the opposite side, it became necessary to build a bridge, and there is now built one of the strongest and neatest wire-suspension bridges we have seen anywhere. It is one span of 325 feet from tower to tower. On this bridge is laid the large 16 inch pipe which carries the water. The bridge has a capacity of holding 40 tons, although only about 18 is now on it. The bridge is a great local convenience, as it is allowed to be used for a free foot-bridge, there being a good walk on either side of the nine. From the bridge, the pipes run some 500 feet on trestle-work to the mill. It was a big and expensive work getting the water to the mill, but once there, all miners can appreciate its value and saving. The entire cost of bringing this water to mill was about $70 000. Water is used in one set of mills, then passes on some 500 feet to what is called the lower mill, where it is used over again. This same water can be utilized several times by carrying it on down the river banks. As to the dry mills, we found these especially interesting from the fact that the process and mode of operating machinery was new and novel. The larger mill adjoins the battery-mill and is driven by the same power. As we throw our eyes up to view the machinery, we see prominently posted what in part explains the mode of working: "The Paul Dry Amalgamating Barrel Process," patented. All ores are amalgamated dry in cylinders, but to have it more comprehensive to the reader as it is new, we will give the operation from the rock-breaker down.

The breaker is a "Gates" which reduces the ore to about a No. 3 wire screen, reducing at the same time a large percentage much finer. This ore as reduced is elevated to a revolving screen, No 5 mesh, which sieved ore is conveyed to the dryer, while the part not fine enough, is returned to the crusher. The ore is dried by steam pipes, instead of fire. As soon as the ore is freed of all dampness, it is transferred to the self-feeder of the pulverizing barrel, which automatically feeds for pulverizing to No. 60 mesh. From the pulverizer the ore is conveyed to another hopper, from which it is transfered to the amalgamating barrel, where it is charged with a large per cent of quicksilver, and such chemicals as are suitable to the ore worked; the charge is then revolved for a given length of time, and this depends on the ore worked, when it is ready for discharging.

When the operation is concluded, in every particle of the charge, mercury in a very fine state can be found; no teaspoonful of the heavy charge but contains it, showing it has permeated every particle. We must say that we are strongly impressed with this system of amalgamation, and especially where the gold is fine. The question in our mind was, as no doubt it is with the reader, how could all this fine 'quick" which must carry the gold be brought together and without serious loss. This point was soon solved to our satisfaction, by Mr. Paul, who favored us with his presence and explanations in examination of the works.

The amalgamated ore was now discharged into a second cylinder, which was charged with hot water, and further chemicals. This cylinder was now set in motion and revolved for a given length of time When ready for discharging a small valve is opened, and without stopping the cylinder, and to our surprise, the quick began to flow out of an iron pipe in a good-sized stream, until some 100 pounds had been discharged into a receiver; this being the amount used in the charge. But this Mr. Paul said had no gold in it, which was another puzzler until explained. The explanation is, that when the valve is opened, the quick leaves the cylinder and passes into the amalgam safe, which is a regular safe with a lock and key, where the amalgam is deposited, and then the mercury flows off into the receiver to be used again. This safe is also Paul's invention. In using this safe no one sees, knows, or can handle any amalgam except the party who holds the key. It is a complete operating contrivance, and works to a charm. The ore which now requires washing off, passes over a silver plate and vibrating table having silver plates; this table is a check for taking up any small particles of quick that might not have gathered in the first operation. From this table the ore passes over an oscillating blanket concentrator, where the sulphurets and other metallic substances are taken up. At stated periods the blankets are washed into a receiver below, from which they pass off to a reservoir especially for sulphurets; the residue now passes off as valueless tailings, and we think they are. The oscillating blanket tables are 14 feet long, and oscillates as the material to be concentrated is washing over, so the surface of the blanket is all the time free of sand piles, so usual on stationary ones. They worked well.

Some 500 feet down-stream from mill just described is another of the same kind. This mill also runs by water-power, the waste water from the other mill being run underground to the mill below. At this place is also a large reverberatory furnace, one of the most complete we have seen in our travels. This furnace is for treating the sulphurets as gathered by both the wet and dry mills. When the sulphurets are completely desulphurized, and while they are in a heated state, they are fed and treated in the same manner as in dry mill described, excepting the sulphurets are reduced to flour in fineness.

Not wishing to pry too closely into the business of the company, we did not get at the per cent saved by this plan of working, but were informed that, all things considered, it was far more profitable than either chlorination or the plan of disposing of the sulphurets. So much for the mills.

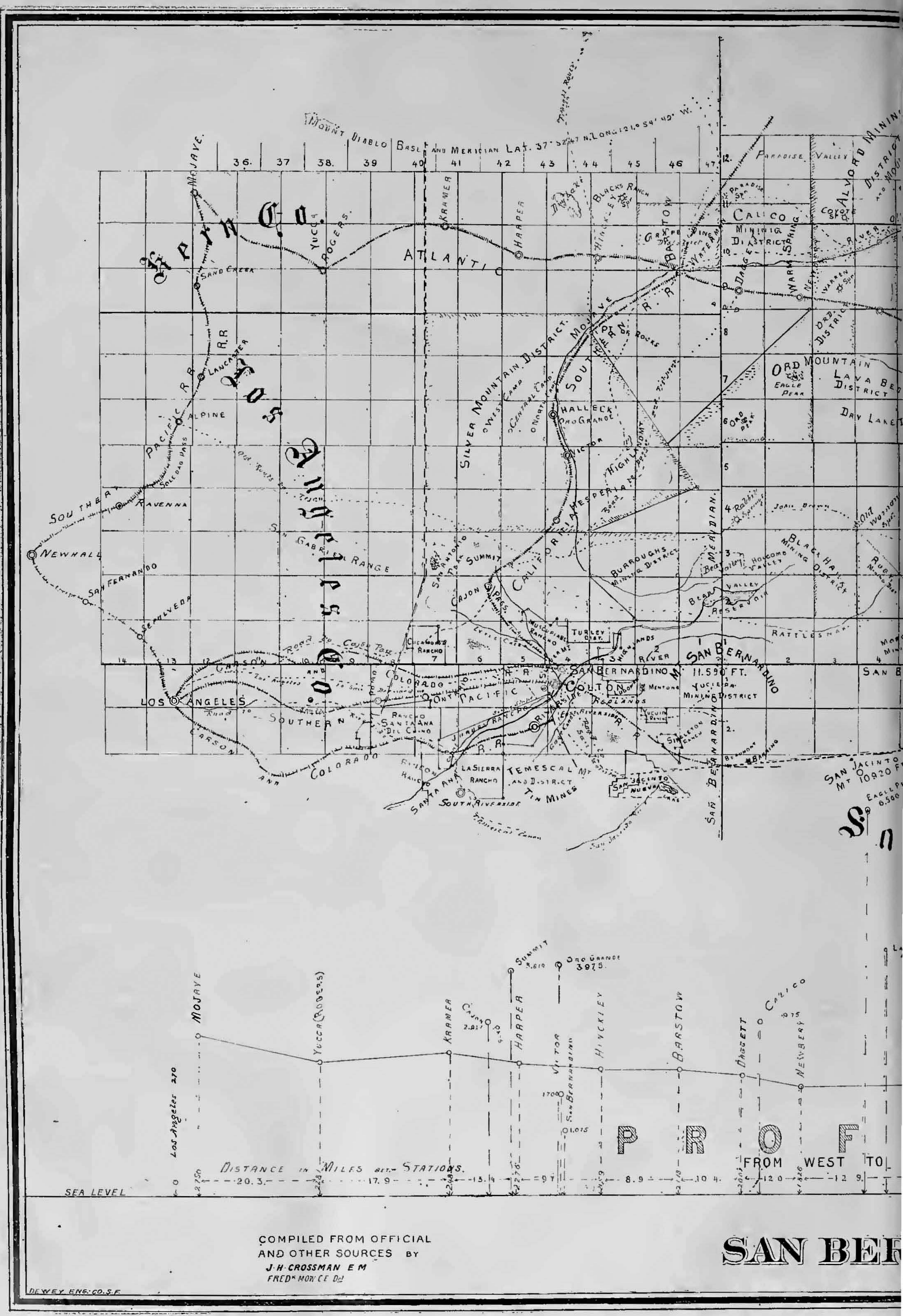
We now look around and see in front the cold, clear Sacramento river, and to the right of the mill, and between it and the river, is a good-sized orchard and vineyard—in fact on both sides of the mill is an orchard. On the place are peach, pear, apple, apricot, nectarine, quince, cherry, olive, orange, English walnut, fig, plum, Italian chestnut, black walnut, almond, and other kinds of trees of best varieties and all kinds of berries. Not only has great attention been given to fruits, but there are some 300 feet of flower-beds that grace the grounds. There is quite a large variety of roses and all of the finest varieties. They raise all the vegetables required for their use, and melons in profusion. Order and cleanliness seems to be the first law about his place. All buildings are placed in line with the mills, and in front of all is an avenue of some 35 feet in width and about 400 feet long, and this is lined with shade and fruit trees and flower-beds, the mulberry being a very conspicuous tree. On the line several large oaks also grace the grounds. The gardens, orchards and vineyards are inclosed with picket fence, and all, including the buildings, are whitewashed. The contrast between the green and white is fine to view. Having an abundant supply of water, after its use as power it performs another duty in irrigating the grounds.

This spot was wild when the company first settled upon it, but little over three years ago. It is one of the grandest marks of what changes capital, industry and taste will do in the way of making a waste blossom as the rose. In the way of living, the employes of the Calumet must fare well, as all share in the good things of the company's grounds. We neglected to state, which our remarks call up, that chickens, turkeys and pigeons seemed plenty. The company work from 30 to 50 hands, according to season and requirements, and as they board their hands, they have a market for all they produce. They work on the principle that money saved is money made. The Calumet Co. is an Ohio company, Ohio capital entirely. Dr. W. H. Garlick is the president, and Almarin B. Paul, one of the oldest miners on the coast, is general manager. Mr. Paul has been manager from the start, and to his taste and industry all is due. All things considered, we cannot otherwise than extend our appreciation for courtesies tendered.

Location of Prominent Mines.†

Mine.	Township.	Range.
A		
Argus (placer)	3	1 E.
Aztec	6	1 E.
Alps	6	1 E.
Alpine	6	1 E.
Alida	6	1 E.
Alvord Group	3	3 E.
Atlantic	3	3 E.
Alabama	10	1 E.
B		
Buckeye	7	17 E.
Bullion (placer)	3	1 E.
Bald Mt. (placer)	3	1 E.
Buena Vista	3	2 E.
Black Hawk Group	3	2 E.
Beauregard	6	4 W.
Bonanza King	10	14 E.
Boss	6	6 W.
Buckeye	7	17 E.
Big Chief	7	17 E.
Brilliant	7	17 E.
Ballast No. 1	10	1 E.
Ballast No. 2	10	1 E.
Blackfoot Con. No. 1	10	1 E.
Blackfoot Con. No. 2	10	1 E.
Blackfoot Con. No. 3	10	1 E.
Burning Moscow	10	1 E.
Boca	10	1 E.
Belle Key	10	1 E.
Bullion	10	1 E
C		
Calumet	3	2 E.
Carbonate	7	17 E
Crœsus	3	2 E.
Canyon	3	2 E
Cliff	3	2 E.
*Cajalco (tin)	3	4 & 5 W.
Cynthia	3	1 E
Coupon	6	1 E.
Central	6	1 E
Crystal Salt	6	21 & 22 E
Cal. Marble & B. S. Quarry Co.	1	4 W.
Carbonate	6	4 W
Cleveland	10	1 W.
Cationra	10	1 W.
Commercial	6	5 W.
Clip Springer	6	5 W.
Colmanite (borax)	6	5 E
Calico	6	1 E.
Chief of the Hill	10	1 E.
Compass	10	1 E.
Calico Queen	10	1 E.
D		
Deglecez	1	6 E.
Dick Turpin	6	4 E.
Dana	10	1 E.
Daggett	10	1 E.
E		
Eureka	2	6 W.
Emma	6	6 W.
Eagle (placer)	3	1 E.
F		
Fours	3	2 E.
Florida	6	5 E.
Four Aces	10	1 E.
G		
Greenback	5	2 E.
General	6	6 E.
Gen McClellan	7	4 E.
Garfield	10	2 E
Grant	3	1 E.
Gambetta	12	10 E.
Greenwood (placer)	3	1 E.
Green	3	1 E.
Garvey	3	1 E.
Galena	1	7 E.
Granite (placer)	3	1 E.
Gulch	3	3 E.
Glasgow	1	4 E.
Golden Eagle	7	17 E.
Grant	10	1 E.
Gem	10	1 E.
Gray Carbonate	10	1 E.
Garfield	10	1 E.
H		
Hunter	7	17 E.
Heola	3	2 E.
Harrison, No. 1	3	3 E.
Hub	3	3 E.
Harrison, No. 2	5	3 W.
Hadsell	12	8 E.
Homestake	6	3 W.
Honey Comb	10	2 W.
Humming Bird	7	4 E.
Hawkeye	7	17 E.
Hermosello	4	6 E.
Holcomb Valley (pl.)	3	1 E.
H. H. Rickets No. 2	10	1 E.
Harmonial No. 1	10	1 E.
Harmonial No. 3	10	1 E.
I		
Imperial	6	6 W.
I X L	12	8 F.
Illinois	10	1 E.
J		
Josephine	6	1 E.
Jesus Redondo	3	1 E
Jenny Lind	10	1 E.
K		
Keystone 1	6	1 E.
Keystone 2	7	17 E.
L		
Lilly	6	5 W.
Lawrence	2	4 E.
Last Chance (pl.)	3	1 E.
Lady Alice	3	2 E
Littlefield	3	1 E.
Last Chance 1	3	1 E.
Last Chance 2	6	1 E.
Lucky Tom 1, 2 & 3	6	6 W.
Lytle Creek (pl.)	2	6 W.
Lyda Hetzel (pl.)	12	10 E.
Lookout	3	2 E.
Little Giant	7	17 E.
Little Scottie No. 1	10	1 E.
Little Scottie No. 2	10	1 E.
Little Bonanza	10	1 E.
M		
Mammoth	10	1 E.
Morning Star	7	4 E
Magnet	6	1 E.
Modesto	6	1 E.
Mammoth	3	1 E.
Midnight	10	1 W.
Morrison	3	1 E
May Queen	12	8 E.
Mt. Bear (placer)	3	1 E
Morongo King	1	4 E
Morongo	1	4 E.
Moonlight	3	1 E
Midnight	10	1 E.
Monumental	10	1 E
Meteor	7	4 E
May Flower	7	17 E
Mill Site	10	1 E.
Milwaukee	10	1 E.
Mastodon	10	1 E.
Mountain View	10	1 E.
N		
Neels (borax)	10	2 E.
New Year	12	10 E.
North Galena	6	5 W.
New Brunswick	3	1 E
Neil Con. No. 13	10	1 E.
Neil Con. No. 14	10	1 E.
Nonparallel	10	1 E.
O		
Old Lady	7	11 E.
Oregon No. 1 2 & 3	10	17 E.
Opal	6	1 E.
Oriental No. 1 & 2	10	1
Oleta	3	2
Oro Grande	6	3
Oro Fino	6	2
Overby Scott	1	4
Occidental No. 1 and 2	10	2
Olio	10	2
Old Oriental	10	1
Odessa	10	1
P		
Pinon	3	2
Portsmouth	3	2
Preciado	4	6

† All these mines are in San Bernardino Base and Meridian. All are in North Range except those few marked with * which are in South Range. The mines enumerated are all quartz except those otherwise indicated as "placer,"



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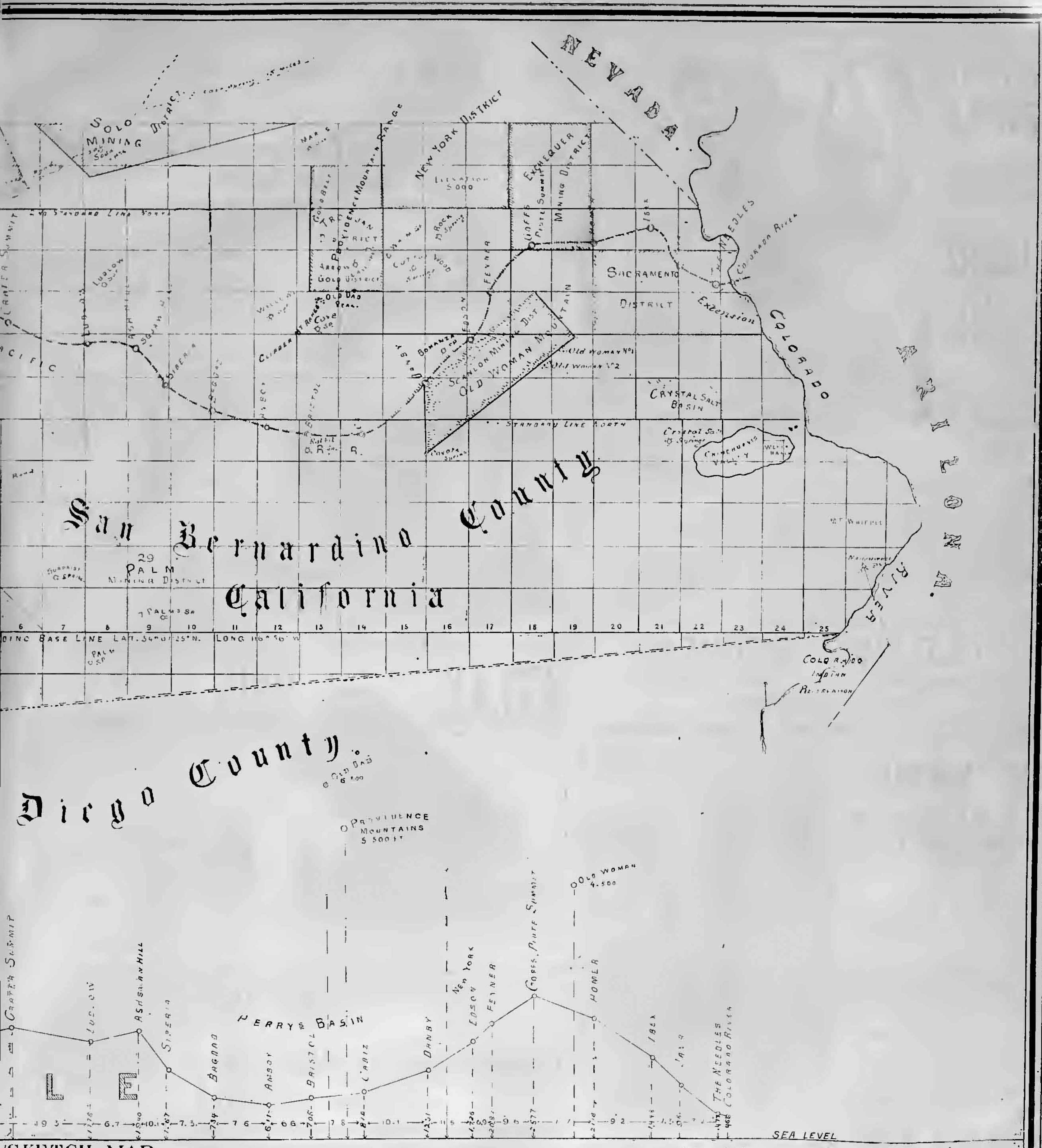

SKETCH MAP
OF A PORTION OF
ARDINO COUNTY
CALIFORNIA

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Mine.	Township.	Range.
sey	6	1 E.
ainsville	6	1 E.
rseverance	10	14 E.
ck	7	17 E.
oltz	1	7 E.
int Conception	6	1 E.
R		
amona	3	1 E.
hy	2	4 E.
ose	1	2 E.
ainbow	3	1 E
o Vista	6	1 E.
obin Hood	6	6 W.
attle	1	7 E.
Red Cloud	10	1 E.
Red Jacket	10	1 E.
Rising Sun	7	4 E.
Run Over	7	4 E.
S		
Stella	7	17 E.
Santa Fe	3	2 W.
Silver Top	7	17 E.
Senator	3	2 E.
Silver Cap	7	17 E.
Sebago	3	2 E.
San Jose	3	2 E.
Silver Odessa	10	2 E.
Stevens Con. Borate No. 1	10	1 E.
Stevens Con. Borate No. 2	10	1 E.
Stevens Con. Borate No. 3	10	1 E.
Silver King	10	1 E.
Snow Bird	10	1 E.
Summit	3	3 E.
Stevens (borax)	10	2 E
Sweet Water	7	3 E.
Spring	6	1 E.
Sun Flower	6	1 E.
San Bernardino	3	1 E.
Side Winder	6	3 E.
Sparkhula	6	5 W.
Stonewall Jackson	10	3 W.
Shearer (granite quarry)	5	4 E.
St. John Quarry (granite)	5	4 E.
San Francisco	1	7 E.
Southern Cal. S S. Co. Quarry	2	7 W.
Silver Belt	6	5 W.
Side Issue	6	6 W.
Silver Wave	7	17 E.
Silver Monument	10	2 E.
T		
Thunderer	10	2 E.
Try	10	1 E.
Triangle No. 2	10	1 E
Toboggan	3	2 E.
*Temescal Tin Gr'p.	3	4 & 5 W.
Tehachipi	6	1 E
Tip Top, No. 1	6	1 E.
Tip Top, No. 2	6	1 E.
Turks (placer)	2	6 W.
Tufa belt	10	1 E.
V		
Ventura 1	6	4 W.
Ventura 2	10	2 W.
Vulture 1	12	2 E.
Vulture 2	12	2 E
Vulture (pl.)	3	1 E.
W		
Wasp	10	1 E
Wonder	3	2 E
Wide West	3	3 E.
What Not	7	4 W
Waterman	10	3 W.
West End	7	17 E.
Waterloo	10	1 E.
White Cedar (pl)	3	1 E.
Z		
Zephyr	10	1 E.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

The Gold Belt of Northern California.

Ancient River Channels and Gravel Deposits.

NUMBER X.

[Written for the Mining and Scientific Press by James F. Talbott, Blue Canyon, Placer Co.]

All of these conditions certainly indicate the correctness of the theory in regard to there being but one main ancient river and tributaries within defined bounds of a certain locality, which contained the original deposit of gold—the source of all recent deposits in that locality. Another fact which tends directly to confirm this view is the discovery within the past decade of a channel deeper than any that has ever been worked or known to exist.

Very Deep Pay Channels.

The effect of this discovery on the future of mining and prospecting will be apparent when it receives the consideration its importance demands. Instead of thousands of dollars being thrown away under the old prevailing ideas that every outside deep gravel deposit overlies an ancient river channel, and the result disappointment and the locality condemned as barren, capital will be intelligently directed, under the new and progressive ideas, toward prospecting for and developing the original source of these deep channels where good and permanent pay will always be found. This deep pay channel was first discovered by accident in the Mountain Gate mine, by a body of cement and top deposit of unknown depth overlying it, which cut off the channel above on which they had been working. The developments made in the deep channel here, indicating its course, induced the belief that it continued down the Forest Hill ridge, and owing to the great width of this ridge between the high rims, the immense depth and width of the overlying deposit, the certainty of a large volume of water and the uncertainty of the position of the channel within this wide scope, it might be on one side of the ridge in one locality and in another on the opposite side. With all of these adverse conditions staring the prospector full in the face, any attempt to discover this channel here required a degree of courage and faith possessed by few, even of this noted fraternity. But one showed up equal to the task, and by his persistent energy Mr. Chappellet has demonstrated to the mining world the continuance of this deep rich channel down the Forest Hill ridge in the Mayflower mine, 15 miles below Damascus.

The success attained by Mr. Chappellet in discovering *the channel* at such a distance below gave confidence in its existence and extent and encouragement in localities above. After an examination of the surface indications, the lava cap inside the high rim-rock, and a correct knowledge of the developments in the Mountain Gate mine, and with all the resources needful to back their confidence, the French company struck the channel rich in the Golden River mine at Red Point, two miles above Damascus. This definitely settles the question in regard to one of the deep original ancient channels in the Middle Fork Divide.

Lava Indicates the River Course.

It is not claimed by this theory that the presence of lava at any given point indicates an underlying ancient river channel; but it is earnestly maintained that a continuous flow of lava for a long distance in a definite course, from half a mile to a mile or more wide, and several hundred feet in depth, within confined bedrock walls, positively indicates approximately the course of the ancient rivers, whose channels are buried hundreds of feet beneath. As branches from the trunk of a fallen tree, lateral spurs may project on either side and form considerable deposits at the junction of some tributary or low depression, but these are off the course of the main flow and are easily distinguished from it.

The Distinguishing Characteristics

Observed in regard to the ancient and modern or secondary deposits are in the ancient deposits a continuous deep channel of a circumscribed width, varying from 300 to 700 feet, within which is found a regular compact stratum of gravel and bowlders on the bedrock, from 1 to 15 feet in depth. The gold is generally fine and the pay uniform in this stratum, which, in the portion of the gold belt here considered, is covered with debris, cement and lava from 500 to 1000 feet in depth.

The surface indications of these deposits are the overlying cement and lava with the bedrock points projecting at right angles from the main ridge.

The modern or secondary deposits, as a rule, are to one side or the other of the main ridges, and are distinguished by their great extent in width and depth in many places. The formation is irregular and composed of all kinds of material found in the surrounding country and deposited in irregular strata of bowlders, gravel, sand and pipeclay to the depth of from 100 to 300 feet, and in the extensive basin-like deposits, are capped with from 50 to 100 feet of fine gravel.

In this class of deposit the gold is very fine and intermixed in certain strata, some of which are 100 feet or more above the bedrock, while some of the intervening strata are entirely barren. It is obvious, then, where the gold is distributed through the deposits in this way that they can only be worked by the hydraulic process. There is another class of the secondary deposits where the channels are narrow and the overlying material not so wide or deep. In this class the gold is generally coarse, and found in crevices and spots. In some localities, strata of gravel are found, high above the bedrock, containing coarse gold.

The Surface Indications

Of this class are: They generally run on a direct course between parallel bedrock points, from where they break off into some modern canyon or river, to where they unite with the main ridge at a considerable angle. The lava frequently extends some distance from the main flow out over these lateral deposits.

To review, the practical points are, the tributaries coming from various directions in the mountain section united somewhere about the upper border of the gold belt and formed the main continuous rivers in the Pliocene period; and by the steep grades in the mountain sections, the greater portion of the gold was carried down into the gold belt, where all of the conditions were favorable for concentrating and retaining it in the original Pliocene channels. The regular deposits in these channels may be compared with the true fissure mineral veins which do not run out or diminish in contents, while the irregular secondary deposits are compared with segregated and pocket veins, which, though often very rich, cannot be relied on as permanent.

The Term "Divide,"

As used here, implies one independent river system of the Pliocene period, disconnected from any other, the same as the present rivers. In comparing the Middle Fork with the North Fork divide, we find a very striking resemblance in general outline and conformation of the country up to a certain point, above which each divide has its own local peculiarities. The Middle Fork divide is separated into two main ridges by a bedrock country through which Shirt Tail canyon runs. The North Fork divide is separated in exactly the same way by Bear river.

About Spring Garden, on the Forest Hill ridge, the gravel deposit runs up under the lava. About 12 miles distant to the northward the same conditions are observed on the Iowa Hill ridge at Iowa Hill. From these distant points, in a continuous course, the two lava capped ridges converge to a certain point above and unite on the main divide, which is not more than a mile in width. A complete parallel to this is found on the North Fork divide, where, at Bogus Point, on the Shady Run ridge, the gravel crops out from under the lava; and about 20 miles to the northwest, on the Nevada ridge, the extensive gravel deposit at Blue Tent runs up and dips under the lava cap on that ridge. From Bogus Point on the south and Blue Tent on the north, the two lava-capped ridges on a continuous course converge to a certain point above, where at one time they were evidently connected at Bear valley.

All the conditions and developments are so well known on the Middle Fork divide that it is unnecessary to refer to them further in comparison, and as all of the conditions are of the same character throughout the whole western slope of the Sierras, we conclude as is the Middle Fork divide so are all the other lava-capped divides.

In this article I have endeavored to

Outline a Systematic Theory,

By which all of the apparently mixed up and conflicting parts can be made to harmonize and form one comprehensive whole. It is the result of my personal observation and experience as a practical miner for nearly 40 years, and is based on observed facts and natural methods. In regard to the facts, I challenge an examination by any mining expert or scientist. As to the correctness of conclusions, I leave the practical progressive miner to decide.

The extensive, unexplored and unprospected section of country is the ridge extending from Bogus Point to Bear valley. This section occupies a position right on the gold belt, covering nearly its entire width from west to east, with rich drift mines both north and south of it. Here are present all of the favorable surface indications and surrounding characteristics of those lava-capped ridges where rich drift mines have been struck and are now being worked. No mining section in the State possesses anything like the same facilities of access for travel and transportation of supplies, as the C. P. R. R. runs on this ridge nearly its entire length.

(*To be Continued.*)

Death of George T. Coulter.—George T. Coulter, a well-known mining operator, died at St. Mary's Hospital, on Tuesday morning, after a long illness. The deceased was born in Baltimore, Md., in 1842, and after coming to this State, engaged in mining pursuits. He soon acquired prominence as an organizer of large enterprises. His last venture was in the Consolidated Esmeralda mine in Aurora, which he succeeded in placing upon the London market.

The sum of $252,370 was disbursed in wages to employes of Comstock companies during the month of July. Of the total sum, the Con. Cal. and Virginia office paid out $49,236.75.

San Bernardino County.

Its Mineral and Other Resources.

NUMBER VI.

[Written for the Press by James H. Crossman.]

Valleys.

Of the 23,476 square miles of territorial possession confined within the boundaries of the San Bernardino county lines, we find lying south and inclusive of the mountain range of that name 6000 square miles, as previously stated, which is subdivided as follows: South of the range, mountainous land unfit for cultivation, 5297 square miles; land susceptible of cultivation, 703 square miles. North of this range, in the so-called desert regions, an area of 17,476 square miles is subdivided as follows: Valley land, 11,651 square miles; mountainous land, uncultivated, 5825 square miles, making a total of of 23 476 square miles.

Of the irrigable valley lands, 256 square miles contain alkaline, saline and borax deposits. Of these there are 216 square miles of alkaline and saline beds, and the balance is made up of borax fields.

Of that portion designated as valley land, at least two-thirds is irrigable less the saline and alkaline bedded deposits. This leaves 7511 square miles which is irrigable and susceptible of cultivation by utilizing the waters of subterranean channels through the medium of artesian wells and a system of storage reservoirs for irrigation purposes.

It is a well-established fact known to all "desert men" that an inexhaustible supply of pure water can be obtained from most any of the dry lakes by sinking but a short distance from the surface. The salt, borax and soda beds contain incalculable stores of wealth of such extraordinary richness that the product is freighted by wagons long distances to railroad for transportation to a market.

Leaving the Fertile Valley

Of the south for the desert region of the north, we cross the San Bernardino range of mountains through Tejon Pass at an elevation of 2927 feet. Descending its northerly flank, we enter a broad and extensive valley, whose lowest depression is 2670 feet above the sea level. The valley at this point is not only bisected by the California Southern railroad, but the Mojave river crosses it and enters the desert region proper through the gate at Victor. This low depression or trough is known as the

Rabbit Spring Valley.

Victor, Ord, the Lava Bed range and several other unimportant and detached ranges form the northerly bank, while the San Bernardino and San Gabriel ranges bound it on the south. Its longitudinal extent is from Mojave Station on the northwest to the Colorado river on the southeast, reaching the river at points opposite Ehrenburg and La Paz that lies on the east side of the river in the Territory of Arizona (a distance of 230 miles). Its width varies from 20 to 40 miles. This valley is not continuous with a regular grade, though the mean of the gradients between the two terminal points is 11.40 feet to the mile. Mojave is 2750 feet above the sea level, while the Colorado river shows an elevation of 127 feet at the point designated.

Dry Lakes.

In this distance there are many basin-shaped depressions of considerable area, surrounded by a rim rock. These depressions are known as "dry lakes." They have been formed from the effects of volcanic action, the lava flow from extinct craters having dammed and obstructed the river's flow at a period contemporaneous with the volcanic outburst that occurred in this region. At later periods, these and other volcanoes broke out afresh and assisted in filling the beds of these newly-formed lakes. The soil of the valley is wonderfully rich in fertilizing qualities, formed from the wash of the mountain ranges on the south, and the disintegration and decomposition of the eruptive rocks on its northerly bank, a combination of lime, soda and decayed vegetation. There is no portion of the valley where water cannot be obtained by sinking from ten to 100 feet, and there can be no question but what artesian water can be procured at greater depths.

The Formation and History

Of this extensive valley is simple and easily understood. At a period anterior to the previously mentioned volcanic outburst that changed the topographical features of this whole region, the valley or trough between the two ranges formed the bed of a river of considerable magnitude. In fact, this was Amazonian in its proportions, and received its source of supply from the far north, with numerous streams and tributaries flowing from the mountain ranges through which it coursed for hundreds of miles from its source, in a southerly direction, skirting the Sierra Nevadas on the west to a point near the boundary line of Mono and Inyo counties, Fish Spring and the White Mountain range. This point was the focus of violent volcanic activity that occurred at no very remote period in the history of the world. The resultant effects of this display of subterranean volcanic forces are here seen in every direction; extinct volcanic cones of mammoth proportions built up from base to summit of the material of their own production form miniature mountains, and isolated volcanic peaks surrounded by large areas of lava, scoria, volcanic glass, tufa and other eruptive products. The center of this disturbance occurring in and on both sides of the river's bed, destroyed its integrity, filling the valley through which it coursed from summit to summit, forming a dam of immense proportions, which in turn formed large and extensive lakes, of which Walker lake remains in evidence. The line of disturbance extending northerly from this point, produced similar changes and obliterated all traces of what was at one time an extensive river.

From the dam referred to at the head of Owens River valley it flowed on its course uninterruptedly in a southerly direction, bounded by the Sierra Nevadas on the west and the White Mountain range and Inyo on the east. The latter, geologically speaking, is formed of the oldest rocks on that portion of the continent west of the Rockies; thence via Owens lake through that extensive valley known as Salt Wells, where the flow of this ancient river was again interrupted by a cross-range of eruptive rocks which formed the dam that flooded and formed the last-named valley; thence to Mojave Station; from there to the Colorado river, a distance of more than 400 miles from the dam referred to on the boundary line of Inyo and Mono counties. In corroboration of

The Theory of the River Channel

That I have advanced, W. A. Goodyear, Geologist of the State Mining Bureau, was much puzzled to account for the immense quantity of water-worn gravel and bowlders that he saw during his examination of that region. I quote his own words from pages 273-4 of the 8th annual report of the State Mineralogist: "The material consists of sand, pebbles and water-worn bowlders * * many of them large enough to weigh from one to 20 tons each. They are scattered far and wide. * * It is impossible to understand how ice in any shape could have produced a distribution so uniform, * * nor could the water of any lake or sea have spread the debris in such a way."

The problem would have been easily solved if the river theory, accompanied by a local upheaval, had occurred to him.

I have digressed and left the county under discussion, but the subject is an important one. It was necessary that I should attempt to show that such a river as I have described at one time existed. Its bed yet remains and is the recipient of the water of an immense watershed. Though not at date coming to the surface as a living stream, it unquestionably flows through subterranean channels and finds its way to the ocean. From this source, artesian water, under powerful pressure-head and in immense quantities, can be obtained to irrigate the desert lands of this now barren and unproductive valley. The valley from Mojave to the river Colorado is not less than 230 miles long by a mean of 15 miles in width, aggregating 3450 square miles of irrigable, fertile land which would support a large population. No portion of this land has been surveyed or located, unless it is a small strip on the border of the Mojave river, it being Government land, and unless withdrawn under the Irrigation Act, it can be had by the settler for $1.25 per acre. I have more particularly described this valley as a type of a large number that exist in these desert regions, that are similarly situated. To enumerate and describe them all would fill a volume.

I have thus briefly described the lands of this arid region that require artificial appliances for irrigating purposes (storage reservoirs or artesian wells). I will, by way of illustration, show what can be done with similar lands that receive their supply of water from natural sources, viz.: Springs that discharge at the surface.

Pahromp Valley

Is situated on the boundary line between Nevada and California—about one-half of its territory in each. The valley adjoins the Yellow Pine range on the north, to which it lies parallel, coursing northeast and southwest. Its extent is 40 miles in length by 18 in width, comprising an area of 720 square miles.

On Yountz ranch, two springs with a combined flow of 100 inches, miners' measurement, irrigate the ranch, on which there are five acres in fruit, consisting of peaches, apples, apricots and figs, in full bearing, producing large crops of high flavored fruit. There is one acre in blackberries, and there are 2½ acres in vines seven years old, 25 acres in alfalfa (cutting four crops of 1½ tons each season), and 95 acres in barley yielding two tons to the acre. Sweet potatoes are a never-failing crop. Irish potatoes yield from 2 to 2½ tons to the acre.

Winters Ranch,

Known as the Pahromp, is situated six miles distant, and has 75 acres in barley, 125 in alfalfa, and 20 in fruit of all varieties producing equally as well as the one first described, with never-failing crops. The atmosphere is so dry that grain can be stored and preserved in cribs for several years without deteriorating. This ranch is also supplied with an abundance of spring water.

John Howell's ranch, 81 miles northerly from Daggett, produces large crops of peaches, apricots, figs, etc. There were grapes on the 15th of June, figs in May and potatoes in April. The ranch is also abundantly supplied with spring water for irrigation purposes.

The Death Valley Basin

Is in Inyo and San Bernardino counties—much the larger portion being in the latter. Its area is 180 square miles—60 long by 3 in width.

The surface of this basin is covered by an earthy, pulverulent, ashy-gray substance containing a large percentage of soda, salt and borax, forming, as a rule, separate and distinct beds. Large areas are covered by an efflorescence of these crystallized minerals of a dazzling whiteness. This, combined with the caustic-heated dust that rises from the bed, affects the eyes of the traveler to that extent that he is compelled to use protective measures while crossing it. The alkaline, saline and borax products of this basin cut an important figure in the mineral resources of the county. They will be described more particularly under the head of "mineral districts." The basin is superficially covered by these powerful mineral substances, but in many places on its bed fresh and drinkable water can be obtained by sinking from 8 to 20 feet, where a stratum of a hard cemented earth is reached, called "the hard pan," usually from 2 to 3 feet in thickness. Below this, fresh water is found. The basin is said to lie from 100 to 200 feet below the level of the sea, but of this no accurate determination has ever been made. This valley is a type, on a large scale, of many others in this region of smaller dimensions.

Borax Lake

Comprises an area four miles in length by half a mile in width. Its surface is covered by a boracic efflorescence and the water below the surface is highly charged with this mineral, which is being utilized by and belongs to Messrs. Searles Brothers. Their refinery is in the vicinity at the head of the lake, which is situated in township 19 N., range 41 west, M. D. M.

Crystal Salt Valley

Lies 27 miles S. E. of Danby, 4 miles S. E. from the southerly end of Old Woman's mountain and 50 miles from the Colorado river, at an elevation of 600 feet above the level of the sea. It forms a basin-shaped depression of 4 by 10 miles in extent. The central portion is 5200 feet long by 2600 feet wide and is covered by a saline efflorescence. Below this crust are found prismatic crystals of great beauty and transparency which are highly prized by scientific institutions and mineral collectors for cabinets, as they do not deliquesce on exposure to the atmosphere. They occur in a solid bed of crystalline salt of unknown depth and extent. Its product is mined by open cuts and hauled in freight teams for a distance of about 30 miles to Danby, for transportation by rail to a market. Of the many unenumerated valleys of extent and importance in these desert regions, we find Soda Lake, noted for its alkaline and saline product; Chinhneva for its agricultural character, and Bear and Holcomb valleys for their immense gold-bearing ledge.

(To be Continued)

The Bodie Mines.

The Standard mine at Bodie is taking on a new life under its new superintendent, Arthur Macy, and promises to again be the "old reliable" mine of all this section. He has made a new departure in the working of the valuable ores of that mine by putting in two Frue concentrators to reduce the expense of milling and, at the same time, obtain close results. While the mill, under the new management, has been running only about ten days, it is considered by all interested that the new process in the milling of the Standard ores is a success, although no "cleanup" has yet been made; but Mr. Macy is so well satisfied with it that he has ordered three more concentrators, which will give him five—sufficient to give work for the 20-stamp mill of the company. The success of the Standard under its new management will be an incentive to other companies, notably the Bodie Tunnel, which has also been placed under the management of a thorough miner—Supt. J. R. Ryan, formerly of the Comstock—to inaugurate the same system of reducing their ores and place the Bodie Tunnel on the list of paying mines, as it is well known that it has plenty of ore awaiting a cheap and thorough process of working.

Mono county, which has poured millions of gold into the commercial marts during the past 12 years, has not been half prospected for its mineral wealth, and many prominent mines have been idle for years awaiting a cheap system of ore reduction which will enable them to take on a new lease of life, be productive and a joy to their owners, if Supt. Macy makes a successful "cleanup" of his present workings, and demonstrates the fact that our ores can be worked closely and economically.—*Chronicle Union.*

New Reduction Works.—The erection of a $70,000 gold extraction works has begun at Grass Valley. The main building will be 107x47 feet. The principal factors of the plant will consist of two sets of Krom's 26-inch steel rolls with crushers, two roasting furnaces and six two-ton chlorinators of the Pollok patent, with other necessary machinery. The rolls and crushers will reduce 30 tons of ore per day, and the chlorinators will treat 200 tons per week, on the basis of ten tons daily. Water will be utilized for what power is desired, two water-wheels having been ordered. The works are being erected by the Grass Valley Extraction Co. of Edinburgh, Scotland, and a representative of the company is now superintending operations at Grass Valley. If found necessary, a smelter will be erected later.

Black Sand Mines.

Gold on the Ocean Beach in Santa Cruz Co.

"Would you kindly direct us to the Black Sand gold mines?"

It was in the village of Aptos, on Friday morning of last week. The speaker was M. H. Hyland, and his companion was a representative of the San Jose *Mercury*.

"They're taking out a good deal of gold down there, ain't they?"

"Oh, yes. I am told they've got a good thing," responded the lawyer without cracking a smile; "but could you tell us how to get there?"

"Where do you want to go—to Cope's or to Raymond's?"

"To Raymond's," was the answer, given at a venture, for neither of the gold seekers knew anything of Cope or Raymond, nor the mines, except that they were taking gold from the beach sands somewhere down the coast, not very far from Aptos.

"Want to go to Raymond's, do ye? Well, now, if you could only get down to the beach here, it would be easy enough, but you can't, cause the gate is locked. You might get the key from Slawson, though. No," he added after a minute's reflection. "Ye can't find Slawson; he went up into the mountains this morning. You'll just have to go around by San Andreas."

"How's that?"

"Well, you jest go down the road past a white house, and then you turn to the left and go about three miles, and then you turn to the right and go four miles and pass a barn, and then you go through a gate and across a field and down a big gulch and under a bridge, and pretty soon you'll come to the mine."

"How far is it?" asked Mike with a groan.

"About nine miles that way. If you could get on the beach, it wouldn't be so far."

The gold-seekers were in for it, and while they had but faint hope of following the directions, they were bound to try, and pushed on.

They succeeded more easily than they expected, and after an hour-and-a-half's drive over sandy, hilly roads, they passed a barn, opened a gate, went through some fields, descended an almost impassable gulch and followed its course until it passed underneath a high railroad bridge, and on the beach just beyond, came upon the camp of F. H. Hansmann and F. Raymond.

These gentlemen and two machinists from Santa Cruz were busily engaged in putting in place a small engine and concentrator, but they cheerfully paused long enough to receive and answer the numerous questions of their visitors. Said one of them: "You know that the black sands of the beaches of the Pacific ocean in many places carry considerable gold, but it is so light and fine that in most cases it is impossible to work it profitably by ordinary methods. People have been experimenting with the sands here for the last ten years, but for the most part without any great financial success. One lucky individual, with ordinary sluices and riffles, did take out $22,000 from under that bridge, but he struck a remarkably rich deposit."

"You say that many efforts have been made to mine the less rich sand without profitable results; on what do you base your hope for better success?"

"On the fact that I believe we have at last succeeded in obtaining a concentrator that will save the gold," pointing to a machine standing at a little distance from a ten-horse-power portable engine. "This," he continued, "is the invention of Woods & Garcelon at Santa Cruz. We have experimented with a smaller machine, and are satisfied it will do the work with five men, four horses and two common road scrapers. We expect to work from 80 to 100 tons of sand a day."

"How much gold do you expect a ton of sand to yield?"

"We expect to be able to save an average of from 75 cents to $1 a ton."

"What is the depth and extent of the black or gold bearing sand?"

"Its extent we cannot tell. We know that it is found all the way from here to Aptos wharf. We do not think it extends far under the bluff, though Cope's mine, below here, is more than a mile inland, and the sand is brought up from a shaft. The black sand is from two to three feet below the surface of the gray sand and is a stratum of from three to four feet in depth. It will be easily worked, as we will strip the gray sand off with a common road-scraper and convey the black sand to the concentrator in the same way."

At the request of the visitors, one of the men went to the edge of the bluff, and, after digging a hole two feet deep, took out a shovelful of the sand and washed it (upon the shovel) in a seepage pool on the beach, the result showing a multitude of tiny specks of gold, indicating a wealth at that particular spot far in excess of the 75 cents or $1 a ton spoken of.

The miners expressed a belief that they would have their machinery in operation during the afternoon and invited their visitors to remain and witness the experiment, but the time could not be spared.

Upon the advice of the miners the visitors on their homeward trip followed the beach line as far as New Brighton (a mile this side of Capitola) where the high bluff can again be reached, the return being made with much more comfort and in a third of the time occupied by the outward trip. This is a fact that possible future visitors will do well to remember.

On the Ridge.

River Mining to Boom.

In conversation with Mr. C. H. Mitchell on Thursday, says the Grass Valley *Tidings*, we gleaned a number of interesting observations made by him on his recent trip to the Ridge in behalf of the Mining Department of the Census Bureau.

Mr. Mitchell stated that he was astonished at the extent to which the Yubas have scoured during the winter and spring. At Bridgeport, where last fall a bowlder projected out of the river-bed two or three feet, the scouring process has been so decided that from 12 to 15 feet of the immense rock is now in view. In other places he noted that the bed had scoured out, where the current was strongest, to a corresponding depth, and was credibly informed that opposite Marysville the bed is now a foot and a half higher than it was last fall. There are untold thousands of tons of debris yet to be carried down, so our Marysville friends will be obliged to continue the work of raising and strengthening their levees. This is to be deplored, but it cannot be prevented.

Our observing brother editor was very depressingly impressed with the absolute "deadness" of the once prosperous and numerous towns of the Ridge. This is a direct result of the war on hydraulic mining. There is no question but that there are millions of dollars of gold hidden in the great gravel banks, and hydraulic mining is the only feasible method of getting at the treasure. Some day, and not far distant we believe, a wealthy syndicate will buy up these abandoned claims and construct a great flume from the center of the scene of their operations down through the foothills to the tule lands in Yuba and Sutter counties. Hydraulicking will be resumed full blast, and through this flume the debris will be washed into the tule wastes, strengthening the levees and converting thousands of acres of the tules into fairly good land. Riffles will be placed throughout the length of the flume and annual cleanups of the float gold thus caught made. This source of revenue, as all hydraulic miners will admit, will prove an important one. The valley people are not such fanatics as to oppose a project so obviously beneficial to them directly and *indirectly*.

In all fairness the State should take up the flume project and assist in carrying it out. The laws of the land have ruined thousands of her best citizens in suppressing hydraulicking, and if reparation can be made it certainly should be. Agriculture and horticulture are assisted by the State and the miners should likewise be encouraged. It is conceded that California has experienced a period of comparative depression since Judge Sawyer's anti-debris decrees have been enforced. Could anything else be expected when the gold circulation was by one fell blow diminished so materially! That it would be to the interest of farmer, merchant and miner alike to forward any project looking to the accomplishment of such an end is too plain to be discussed. That the project is feasible is apparent.

The Mining Bureau Museum.

The following are among the recent additions to the State Mining Bureau Museum:

Number of rich specimens of silver ores from Montana, from J. Z. Davis and C. W. Leonard.

Gold quartz from Siskiyou county.

Ouvarovite, Shasta county, H. Williams.

Gold quartz, several specimens from Shasta, Tuolumne and Fresno counties.

Large number of coal, iron, copper and other specimens of economic interest from the Eastern States.

Very fine ancient stone ax, Arizona, John H. Ordway.

Rich silver ore, Sonora, Mexico, E. M. Railton.

Melanterite, Petaluma, Cal., Ben C. Hessletine.

Very fine crystals of magnetite, Lake Champlain, N. Y., John Birkinbine.

Chromic iron (several localities), California, D. M. Miller and others.

Pisolitic limonite on chalcedony; dogtooth spar on conglomerate; smoky quartz crystals, phosphate of lime, epidote, garnets, etc., from W. Q. Mason, Volcano, Amador county.

Building stone, Ione, D. O'Neil.

Native mercury on cinnabar, New Almaden, J. B Randol.

Columbite, Etta tin mine, South Dakota.

Antimony and Gypsum.—A correspondent of the *Silver State*, writing from Lovelocks, Nev., says: Antimony is being mined considerable. Mr. Senn, who has mines producing this metal near here, and who worked them some two or three years ago, has returned and with him Mr. Edwards, a representative of a company which will purchase the property upon a favorable report by Mr. Edwards. However, whether the mine be sold or not, it will be worked and the ore either reduced on the ground or shipped to California. Thies & Hutchings have shipped three cars of antimony to San Francisco; that metal being high makes those mines valuable. H. J. Bender is also having antimony hauled for shipment. A San Francisco company is about to purchase the gypsum deposit lying about four miles west of town, and if the purchase is made will commence shipping by the 20th of August, and calculate on handling 600 tons per month, there being mountains of the sulphate in sight.

The Big Trees.—Gov. Waterman has received a dispatch from the Secretary of the Interior in which he says: It is not true that the lands you mention are about to be open to survey. The sequoia gigantea has been protected by a very recent decision of this department and orders to reserve all of the ground upon which they are growing, both in Tulare county and in Yosemite, for the latter of which, as you state, a bill is pending in Congress. I have written you this day showing the full correspondence on this subject, which is most positive and energetic in defense of the sequoia gigantea.

The Irrigation Surveys.

It is difficult to learn yet the fate of the irrigation work at the Government expense. So far telegrams seem to indicate the likelihood of the withdrawal of the appropriation for the continuance of the work under the Geological Survey, as both the House and Senate have acted thus far in that direction.

There seems to be a serious conflict in the statements put forth as to the character of the reservation of public lands under the Act of 1888, to which allusion has been previously made in these columns. For example, Senator Dolph of Oregon writes to a Portland paper as follows:

"It has been construed by the Attorney-General and Secretary of the Interior as withdrawing all irrigable lands of all the arid region from the operation of the land laws without any action of the department, and it is held by the department that, as the irrigable lands cannot be segregated from the arable lands without a survey, the operation of the general land laws in all the arid region is suspended, not only as to irrigable lands, but as to arable lands, timber lands, etc.

"This region, as marked out by Major Powell and adopted for the action of the Interior Department, is substantially bounded on the north by the Dominion of Canada; on the south by Mexico; on the east by a line drawn nearly through the middle of North and South Dakota, Nebraska, Kansas and Texas; and on the west through Oregon and Washington by the Cascade mountains; and through the upper part of California by the Sierra Nevada mountains to about the latitude of Santa Cruz, from which point the Pacific ocean is the boundary, being a tract of land containing approximately two-fifths of the area of the United States."

Such a reservation of public lands from settlement naturally would awaken the strongest opposition from representatives of sections which depend largely upon the settlement of adjacent public lands for their development, and suggest the conclusion which they freely make that the Texas representatives relish that because Texas owns all her own unoccupied lands, and to shut up Uncle Sam's real estate office would send customers to the Texas land-dealers. But this conclusion does not seem to be a fair one if the statement attributed to Secretary Noble in the following telegram is the true one:

"An answer to inquiries regarding the irrigation surveys contained in the recent Senate resolution was sent to the Senate to-day by Secretary Noble. He states that the Director of the Geological Survey actually surveyed and marked the boundaries, and that the areas of the sites for reservoirs were by him selected under the Act of 1888, and that the tracts so segregated were so marked that they can be discovered on the ground and delineated on the Land Office maps.

"In the reservoir site selections only so much land has in each instance been reserved as is intended to be used for storage of water. It was not intended, the Secretary says, that the surveys and selections under the Act of 1888 should be carried to the extent of planning a system of canals, ditches, checks and furrows for the distribution of water over farms, as it was deemed that people, when they come to cultivate these lands, can better do this themselves.

"The general purpose and plan of the department, the Secretary says, is to preserve the sources of water supply from the possession or appropriation of individuals or corporations. It is believed, he says, that it will be the duty of his Department, so long as this statute remains, to enforce it, that its fruits, at least in the preservation of the sources and reservoirs of water, may be kept under either national or State governmental control."

This would indicate that only sites suitable for actual use in the storage of water are reserved and they are clearly marked on the land office maps, and that the claim that "two-fifths of the area of the United States" is locked up is not true. Probably a little more time will straighten out these matters.

A Monster Iron Girder.—One of the two immense 70-ton iron girders which are to span the assembly hall in the McAllister-street wing of the City Hall has arrived, and has been brought to the McAllister-street side of the building. The girder was built by the Keystone Bridge Company of Pittsburg, Penn., and is the largest ever constructed in the United States, so far as known. It is 105 feet long, and is built of wrought steel plates riveted together.

Another shipment of bullion, valued at $27 927 46, has been made from the Con. Cal. and Virginia mine to the Carson Mint, making total shipments of $119,578 93 to July account.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

The Gold Belt of Northern California.

Ancient River Channels and Gravel Deposits.

NUMBER XI—CONCLUDED.

[Written for the MINING AND SCIENTIFIC PRESS by JAMES F. TALBOTT, Blue Canyon, Placer Co.]

Considering the present outlook for hydraulic mining, with all of the favorable indications staring the miner square in the face, and all of the advantages here presented, it is unaccountable that no effort is made to open out drift mines on the deep channel in this ridge.

The great changes in the character of the gravel mines, from the pioneer days to the present time, were so gradual that the point where one class apparently led into the succeeding one was rarely observed at the time.

Classes of Gravel Claims.

There are three distinct classes of gravel mines recognized: First, the bars, rivers, ravine and canyon diggings; second, the deep gravel deposits on the hills; third, the deep channels underlying the lava-capped ridges.

With but few if any exceptions, each class was first discovered by accident, and afterward the discoveries in that class were extended by a comparison with the conditions observed where the deposits of pay were found. The first discovery of gold in California by Marshall was by accident, on a bar on the South Fork of the American river. There was nothing peculiar or different in the conditions of that bar from any other on the South Fork or any other river bar. All of the conditions were observed on the bar where the gold was first found. On comparison, other bars were found to be exactly similar. The natural conclusion was that all river bars in the gold region contained gold, the truth of which was subsequently verified.

There is no account of the first discovery in ravines and canyons. It was no doubt by accident, for in many places in pioneer days the gold lay exposed on the surface in the gulches and ravines, many of which proved to be very rich. From this it was inferred that all ravines and canyons were rich, which proved to be a mistake, as the conditions for pay were not so well known then as now. This class of diggings was the only one known for several years after the first discovery and it was apparent from their character that they would be exhausted in the course of a few years. But before any appreciable effects from this source were felt, the second class of deposits on the hills was discov- [illegible] Georgia Hill. The discovery of this class gave promise of a more permanent character than the former and gave an impetus to prospecting that has never been equaled in the State. By a comparison with Georgia Hill the conclusion was jumped at that all gravel hills in the gold region contained rich deposits of gold. The result was the discovery and development of nearly all the hill diggings for 50 miles to the north on this gravel belt and added carloads to the product of gold. Previous to this, however, in a few places rich leads had been followed into the hill and were being worked, but these were considered as local peculiarities and had no general effect like the later discoveries.

Under Lava Ridges.

The third class comprises the channels under the lava ridges. An "accident" occasioned by a big slide on the south side of the ridge near Forest Hill revealed the conditions that led to the first discovery of this class here. By the same course of comparison in this class as in the others the discoveries were extended and the fact established of the existence of mines of a more permanent character than either of the others. The natural conclusion is that all lava-capped ridges of this character within the gold region contain similar mines, the correctness of which appears to be well sustained as far as developments and discoveries have been made up to the present time.

For the past 20 years or more I have entertained the views herein expressed; and following on this line of reasoning, by a comparison of the surface conditions observed on the Shady Run Ridge with those on the Forest Hill Ridge, the similarity is so striking that I believed the underlying conditions would be found to correspond, and that a deep channel could be found in the former similar to the one in the latter, running on the same course from northeast to southwest.

As an earnest of my confidence in the result, about 15 years ago I bought and located mining ground of considerable extent, covering the lava-capped ridge, for the purpose of prospecting, to determine the correctness of my views. I located and started a tunnel with the resolution to see if there was a deep channel underlying the ridge, and if so, to find the bottom of it, if I lived long enough. The undertaking was termed by local mining experts, most of whom were "cross-channel theorists," as "a d——d fool operation," and predicted I would strike high bedrock before getting back 500 feet.

A Practical Example.

For the want of means but little more than the required annual expenditure was done for several years. All efforts to procure any assistance from local capital were unavailing. Persisting in my efforts, I formed the acquaintance of an enterprising party of San Francisco who took a favorable view of the situation and was willing to put some money in the plant. Accordingly an adjoining location was made, and the claims consolidated under the name of the Elite Consolidated Mining Company. Work was then commenced and the tunnel that had been started was extended back into the ridge 1100 feet, from which point a shaft was sunk 158 feet to bedrock. [See engraving of section of ridge and gravel claim on another page of this number of the PRESS.—EDS. PRESS.]

About 600 feet east from the station at Shady Run, at the head of a ravine, where the rimrock has been carried away and exposes the cement to the depth of 50 feet, overlying 5 or 6 feet of fine quartz gravel on the bedrock, the tunnel, six feet wide and six high, starts in the rimrock on a drainage grade and runs on an air line, north 70° west, the distance of 1100 feet. It was known this was not deep enough to bottom the channel, if there proved to be one. The calculation was that the tunnel could be run in the cement at this point and a shaft sunk to ascertain the depth—much cheaper than any other mode of prospecting—and if pay was found the mine could be operated through the present works, which are substantial and constructed with reference to such a contingency, until a tunnel could be run to bottom the channel. From where the present tunnel starts in, the bedrock pitches gradually to the northwest and dips under the cement about 200 feet back. The tunnel passes about 200 feet perpendicular under the railroad right at the station. The cement along in the tunnel here is as hard and solid as ordinary slate bedrock. After passing some distance beyond the railroad to the west, strata of coarse sand were encountered. Occasionally the whole face of the tunnel would be in a bed of sand. On this account 400 feet of the back portion of the tunnel was substantially timbered. When coming into a solid body of the cement again, the shaft was started. At the depth of 35 feet the cement gave out, and 20 successive distinct strata of sand, gravel, clay and lignite were passed through before bedrock was reached. At the depth of 52 feet we came on to a stratum of solid, compact white clay. Immediately underlying this was found an unmixed bed of lignite three feet thick, composed apparently of a drift of wood, bark, leaves, grass and other vegetation, among which cedar bark and tamarack wood are readily distinguished. One of the curiosities found here might be of interest to the naturalist—that is, on the leaves of what appears to have been some kind of a water plant is found a small insect of a bright green color as natural as life. In size and color it resembles very much a small insect often seen skipping along on the surface of still water in [illegible] strata of clay with lignite in thin layers intermixed all through.

At the depth of 100 feet we passed through a bed of pipeclay 22 feet thick. Below this was a few feet of sand and drift. The next below was as fine a body of smooth washed quartz gravel and cobble as I ever saw; and here the first color of gold was found 1100 feet back from the outside rim and about 500 feet from the surface on the ridge. In every pan of this gravel, fine colors of gold can be got. Where the gravel was struck in the shaft, it dipped to the northwest into the ridge at about 15 degrees, while the bedrock 25 feet below pitched in the same direction on an angle of 35 degrees, which induces the belief that this is the lower rim of the deep channel. When it is considered that the rimrock along on Canyon creek is about on the same level with the C. P. R. R., that this tunnel runs about one-fifth the distance through the ridge toward that rim, and that the bedrock pitching steep in that direction at the end of the tunnel is 350 feet below the railroad track, the fact is established beyond a doubt of the existence of a deep channel, which fact is *now* generally admitted.

Admitting the existence of the channel, the pull now is, you don't know if there is any pay in it.

Pay in Deep Channels.

The indications are as favorable and the presumptive evidence as strong in regard to the pay as to the existence of the channel; and it is the present intention of our company to demonstrate the former in as positive a manner as we have the latter, by running a slope from the end of our tunnel on a grade that will reach the bedrock 300 feet beyond the shaft, where it is confidently believed we will strike the original deposit of gold in the deep channel of the North Fork Divide, that will develop as rich as any found in the Gold Belt. The fact of the two ridges that form this divide uniting, as heretofore described, evidently shows their contents were derived from the same source. Upon reliable authority, the figures show that $100,000,000 of the contents of this divide have been realized in the output of gold since 1849, from the gravel mines alone, between the South Yuba and the North Fork of the American, the greater portion of which came from the Nevada Ridge. Owing to the peculiarity of that ridge in spreading out over a wide extent of country that was easily prospected, many of the rich mines were developed at small expense, which attracted the capital that subsequently developed the vast mineral resources of that section.

Shady Run Ridge.

The peculiarities of the Shady Run Ridge are its narrow, confined condition, with but few gravel deposits connected with it. In regard to its contents, nothing directly is known, but from all of the surrounding conditions, the natural inference is that it contains rich deposits of gold. It is situated right in the center of the Gold Belt, with rich drift mines both on the north and the south, and for 15 miles or more on either side the ridge, where the rim has been cut away to a certain depth, rich spots of pay have been found in the near vicinity and nowhere else. The millions of dollars in fine gold taken from the Dutch Flat and Gold Run mines unmistakably came principally from this ridge. With all of the favorable indications and advantages presented, with the exception of a few individuals gouging around in outside spots, there is not a drift mine between Bear river and the North Fork of the American. Why is this so? Simply because the drift mines of permanent value are buried deep beneath the lava-capped ridge, beyond the reach of the individual prospector's means, and companies with capital decline to take hold until something rich is developed.

Future Drift Mines.

The fact is now pretty well established that the future drift mines of permanent value will have to be sought for under the deep lava-capped ridges that overlie the ancient channels, and from a careful observation of the surface conditions and following on the line of natural methods here indicated, it is confidently believed that every ancient channel on the western slope of the Sierras within the Gold Belt can be as definitely traced out as those of the Middle and North Fork of the American.

Causes of Failures.

There are few localities in the mining region but what have been cursed with some bogus prospecting and mining operation managed by a class of "pedro" miners more for the purpose of the five or ten dollar a day salary than to obtain valuable results. The method is to make a haphazard location of a claim as near the town as circumstances will permit, or bargain with a silent partner for a worked-out claim at a round price. A forced and unnatural connection is made between the claim and every rich mine within the circumference of 40 miles. Some rich friend is taken into the secret of this hidden wealth and supplies the means to obtain it. After spending a few thousand dollars and getting nothing but favorable reports, the rich friend gets a "clue" and takes in the situation, curses the claim, the management and the whole section of country, and permanently retires from the business. Any other kind of business in the country besides mining, based and conducted on this principle, would result in failure. The principle of home rule will have to be adopted, so that each locality will have to stand on its own merits of [illegible] claims at random find many serious obstacles to overcome in their efforts to run every rich channel in the country through their claims. I would suggest a less difficult method, one with greater possibilities of valuable results—that is, to trace out the channels first, then make the location with reference to them. "In the days of old" all that was required to prospect and develop a rich mine was a mule-load of grub, a pick and pan. The changed conditions now demand considerable money, abundance of muscle and the power of steam. Where these are directed by honest, intelligent, practical miners, on sound business principles, the business of mining will be as successful as any other business in the country.

The "Blue Bucket" Mine.

In 1845, a party of immigrants under the leadership of Stephen Meeks, left the usually traveled route at the mouth of the Malheur river and traveled up that stream, intending to cross the Cascade mountains at the head of the Willamette valley. Cloudy and foggy weather set in obscuring the land-marks and the party got lost and wandered about the great basin in which Harney lake is situated, for some weeks, suffering intensely for food and water. During this wandering some one brought into camp some substance supposed to be gold dust. Out of this find has grown the mythical mine, sometimes called the Wagon Tire mine and sometimes the Blue Bucket mine. The term "Wagon Tire" was applied, because it is said in testing the substance, some of it was beaten flat on a wagon tire, from which circumstance it was concluded the substance was gold. When it was concluded that the yellow stuff was gold, one of the enthusiastic finders exclaimed: "Why! If that is gold, I can fill a blue bucket with it;" and from this expression it is sometimes called the Blue Bucket mine. The parties were too much pressed with hunger and thirst to stop and locate the mine. It must also be borne in mind that all this occurred in 1845, prior to the discovery of gold on this coast, and at that day people were not familiar with gold, either as dust or coin. From that day until this, wild tales of these mystical mines have been told, and many have been the expeditions which have been fitted out to refind this mine. In a Pendleton paper we see it announced that a few days ago a party started out sanguine of finding the mine.—*Oregon Courier.*

DURING the first seven months of the current year, the Daly mine of Utah had an output of 6316.16 ounces bullion, $295,110.70 of sulphides, and sales of ore which realized $78,273.90. Seven regular monthly dividends, of 25 cents per share each, making a total of $1.75 per share, were paid. The total dividends paid by the Daly to date are $1,575,000.

San Bernardino County.

Its Mineral and Other Resources.

NUMBER VII.

[Written for the PRESS by JAMES H. CROSSMAN.]

Sources of Water Supply.

There are only two important rivers flowing through San Bernardino county on the southerly and westerly slope of the San Bernardino range of mountains, and these are not navigable streams but very important sources of supply for irrigation purposes. The rivers referred to are the Santa Ana and the San Jacinto. There are, however, several large creeks, namely, Mill, Lythe, Warren and City creeks, from which immense quantities of water are taken for irrigating the rich but arid lands of the valley. The other streams that derive their supply from the San Bernardino mountains are the San Louis and San Diego, which, after flowing through and enriching the thirsty soil, discharge their waters into the Pacific ocean.

The desert region north of the San Bernardino range of mountains contains but few running streams. The principal, and in fact the only one of importance and note, is the

Mojave River.

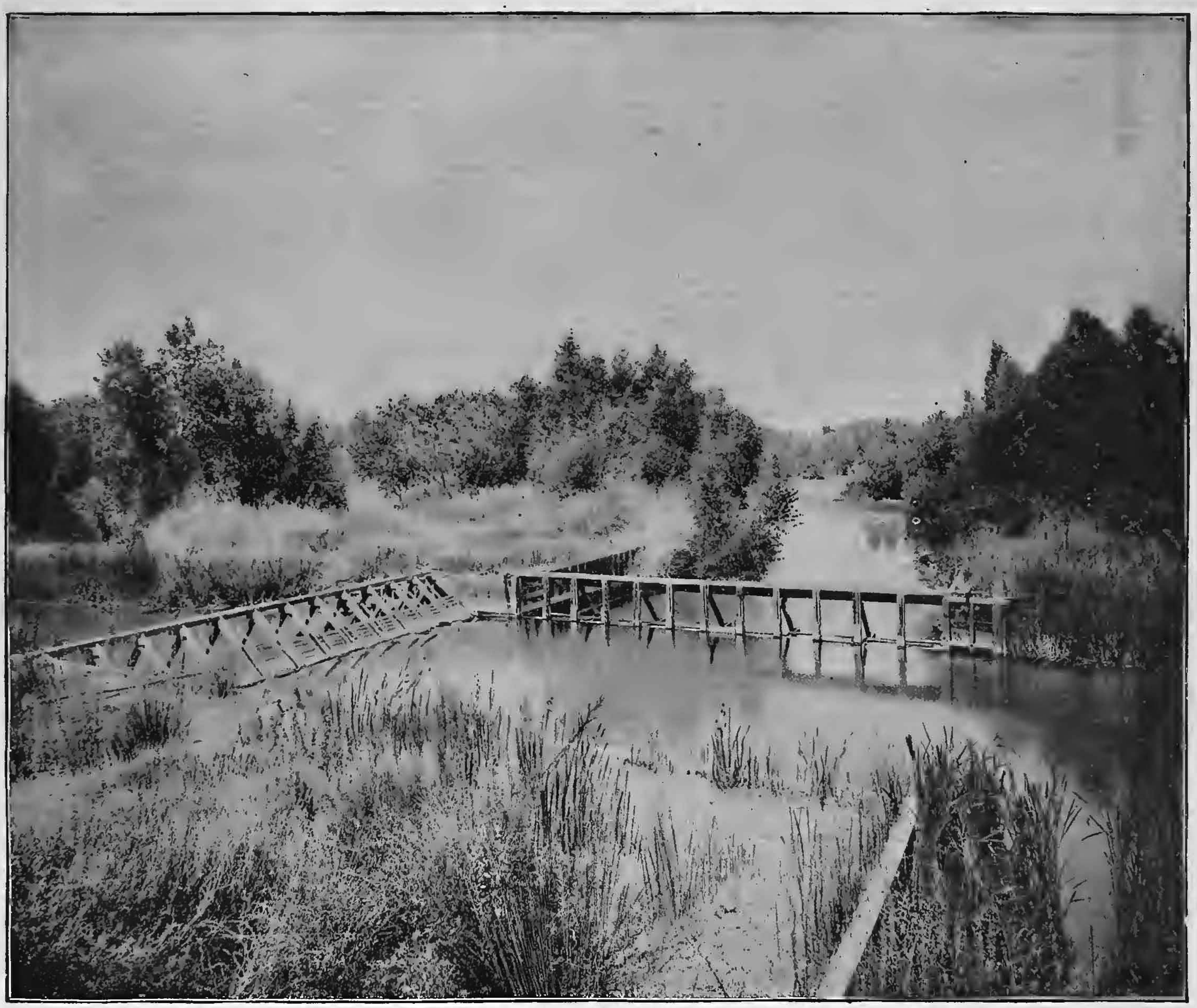
It takes its rise in the San Bernardino range of mountains. Its principal fork is in Holcomb valley and flows northerly for a distance in an air-line of 75 miles from this point. It diverges and takes an easterly course, disappearing and sinking in Soda lake. From this point its waters flow in all probability through subterranean channels and discharge into the Pacific ocean either directly or via the Gulf of California. Its total length as a surface stream is about 200 miles, but it is eccentric to that extent that it is known as "The Hide and Seek River" of the Western continent. During the winter or flood season it forms a torrential stream of considerable capacity, in places overflowing large areas—in fact at this season of the year it carries such a volume of water that the late General John C. Fremont, in the employ of the United States Government in 1846 and 1847, reported to his superior in Washington that it was an inland navigable river (vide Congressional Reports). At its lowest stage in the summer season it carries a volume of not less than 10,000 inches miners' measurement. Its eccentricity consists in appearing and disappearing from view as a surface stream for considerable distances. On its course it disappears from sight several times, either absorbed by the sands, which have the carrying capacity of 22 per cent of water, as has repeatedly been proved by instrumental tests, or flowing through subterranean channels.

It flows as a surface stream from its source to a point 12 miles above Victor, when it sinks and continues invisible for a distance of 12 miles. At this point it comes to the surface, the granitic formation at "the gate" forming a bar to its further subterranean progress. Here it runs for a short distance forming a stream of that magnitude that it is unfordable during the flood season. Disappearing below the surface again, it is not seen for a distance of five miles. At a point above Oro Grande it reappears, having apparently lost none of its volume. Running for five miles, it reappears at a point above Cottonwood Station, and runs for one mile, then sinks and is invisible for a distance of 15 miles, rising at Barstow, where it is only seen for half a mile and disappears for six miles, coming to the surface at Fish Ponds, the site of the Silver Valley Land and Water Company's submerged dam to which I have previously made reference. From this point the water flows on the surface for a distance of one mile, sinks, and is not seen again until it reaches Hawley's Station, 12 miles distant, and flows here for half a mile and is not seen again until it reaches Camp Cady, where it comes to the surface and flows for one mile, then disappears from sight for 18 miles, rising at Cave Canyon. At this point a high ridge and narrow gorge occur similar to that at the "Victor gate" (this rim at one time evidently formed the rimrock of an extensive lake, the ridge standing at an elevation of 300 feet above the river-bed and only 200 feet in width) A dam could easily and cheaply be constructed here, forming a storage reservoir of great capacity overflowing a large area. Through this obstruction the Mojave river has cut its way.

The river now flows uninterruptedly as a surface stream for 10 miles with to all appearances its original volume, until it closes its career (except in extraordinary flood seasons) as a living stream by taking its final plunge into the desiccated and alkaline bed of Soda Lake. At periods of uncommon floods it rises to the surface at a point 20 miles distant and forms a junction with the Amargosa river; the united streams finally lose their waters in the south of Death Valley basin at a point near Saratoga Springs. Where the Mojave river comes to the surface the banks are covered by a dense growth of cottonwood and willow, and when cultivated produce large crops of grain, vegetables, fruit and alfalfa, evidences of the fertility of the soil.

The Amargosa River.

Though of minor importance in its volume and purity, its water being unfit for either agricultural or drinking purposes, this river has an important duty to perform. Its extreme length is 140 miles, commanding an extensive area of tributary watershed. This river with its affluents courses through a section of the country in which the rocky formation contains an unusually large percentage of alkaline and saline mineral. The erosive action of the waters of the river and its tributaries on these friable and easily disintegrated rocks, with the assistance of atmospheric influences, rapidly destroys their integrity and dissolves the soluble minerals. The pure water of the river, under the powerful rays of the sun in this desiccated region, is segregated and evaporated, leaving the mineral product held in the form of a dense briny caustic solution; as the water decreases in volume evaporation is more rapid and the water becomes charged to its fullest capacity. To the eye of the thirsty traveler it is limpid and pure, but sure and certain death to the man or beast that partakes of it at this stage without remedial measures.



HEADGATE AND WASTEGATE OF KERN ISLAND CANAL, TAKING WATER FROM KERN RIVER.

The river has here performed its mission; it has served in a threefold capacity—first, as a disintegrator, second, as a carrier, and third, as a concentrator. Its remaining water is now drank up by the thirsty sands of the desert, leaving its mineral contents on the surface in a crystalline form ready for man's use. The alkaline, saline and borate beds in the region of Death Valley receive their supply from this and other sources, and so long as the sun shines and water runs this and similar regions will continue to produce their quota of these alkaline minerals.

The Amargosa river has its source in the State of Nevada about 30 miles easterly from the State Line gold mine on Gold mountain, and makes its first appearance as a river at the northerly end of the Oasis in Nye county, Nevada. Its general course is southerly until after passing through the Amargosa borax fields near Resting Springs through a deep canyon in the vicinity of the Salt Spring gold mine, where its course suddenly changes to almost due north, when it soon after sinks and disappears at a point near Saratoga Springs.

Furnace Creek

Takes its rise on the western slope of the southerly end of Grapevine Mountain in the Death Valley or Funeral Range of mountains, receiving its supply of about 200 miners' inches of water from a spring of pure cold water. It runs in a westerly direction for a distance of about three miles and sinks in the sands of Death valley. From this creek the extensive refining works formerly belonging to W. P. Coleman obtain their supply of pure, fresh water for domestic and other purposes.

Springs.

In the desert region springs of considerable volume and strength occur, particularly in the vicinity of mountain ranges. Their sites were sedulously guarded and concealed from the white man's gaze by the aborigines of the desert—the Piute Indians. To them they were the key to the citadel. Without water neither white nor red man could exist, and the springs were "few and far between." Drives of from 30 to 50 miles had to be made over burning sands to reach them, and if the traveler without trail or road missed his course and got lost, death was his portion. The Indians held them in greater esteem than silver or gold, but were induced to impart the secret of their hiding-place to a white man in whom they implicitly trusted by the name of John Moss. He in turn disclosed their whereabouts to members of his race, the prospectors and miners.

Lo the poor Indian of the Piute tribe is nearly extinct and the well-traveled trails of the white man have replaced the faint moccasin tracks made by the red man's feet. The desert is no longer a sealed book, but can be traveled with comparative safety at least in beaten tracks.

The forthcoming map, to which I have previously referred, will show the principal springs, and this serial article will serve as a text-book that will assist the desert traveler to find them.

Coyote Holes Spring is situated seven miles north of Hawley's station, on the southerly border of a dry lake; water saline and containing two per cent salt and one per cent borax, unfit for drinking purposes. It is in Tp. 11 N., R. 3 E., S. B. M. Thirty miles north of Daggett and on the western border of a dry lake is a spring in Tp. 14 N., R. 3 E., S. B. M.

Irawatz mountain, situated 70 miles northeast of Daggett, on south border of Death valley, contains numerous springs.

Cave Springs are 30 miles northwest of Garlic Springs, in a low gap in the Irawatz range, on the Resting wagon-road, two miles below the summit, on the north side, 13 miles from Tp. 9 N., R. 14 E., S. B. M.

Saratoga Springs are situated on the north side of Death valley at the base of Tom Wattles mountain and 18 miles west of the mouth of the Amargosa river, Tp. 22 N., R. 2 E., S. B. M.

Soda Lake, a dry lake, is situated in Tp. 12 N., R. 8 E. Though a dry lake, it has numerous springs of living water on its borders.

Paradise Springs, situated on the first range of mountains north of the Calico range, 20 miles north of Daggett, at an elevation of 2500 feet, Tp. 12 N., R. 1 E., S. B. M. These springs comprise a group, some of them hot, others cold, water pure.

Garlic Springs are situated on the Resting Spring road, Tp. 14 N., R. 3 E., S. B. M., where, for a distance of four miles, there occur numerous springs, the largest furnishing 18 inches of water, M. M.

Hot Springs lie on the east side of the Amargosa river, near McLane's ranch; temperature of water, 120° Fahr. It flows 337 miner's inches, and is celebrated for its medicinal qualities—severe chronic cases of inflammatory rheumatism have received permanent cures in brief periods.

Situated in the same vicinity flows thermal water of medicinal qualities, said to be a specific for certain diseases. There is also a cold spring in the vicinity flowing pure and drinkable water.

Oasis Springs form a marshy meadow of eight miles in length by one-fourth of a mile in width.

Ash meadows lie two miles east of the Amargosa river, on the Nevada State line, in which are several living springs of water.

The "Four Springs" occur in the range of mountains that extend along the eastern slope of the Death Valley basin at the base on the west of the range, distant from each other from one to three miles, one of them flowing from 250 to 400 inches of water, miner's measurement, and innumerable small ones that flow from one to 50 inches each. On the south end of the valley is a large spring the water so clear that at a depth of 70 feet small objects can be distinguished on its bottom.

Keane spring is one of considerable strength, 40 miles northeast of Ash Meadows.

Resting springs consists of six springs, flowing from 1 to 100 inches each, situated three miles east of the Amargosa river on the west slope of the Resting Spring range. Tp. 21 N. R. 8 E., S. B. M., 90 miles northeast of Daggett.

At Chinese ranch on Clark's fort, six feet under the surface, water can be developed in sufficient quantities to run a smelting plant of any capacity.

New York mountain is well supplied with water from springs.

Pahrump valley, at an elevation of 3000 feet, 40 and 18 miles, in extent contains two springs 50 feet apart, the combined flow being 100 miners' inches.

Pahrump spring furnishes a regular flow of 800 inches miners' measurement.

29 Palms.

An important spring occurs in the vicinity of 29 Palms, from which flows a strong body of water. It gushes forth from the foot of a low mountain with considerable force. Its volume is sufficient to form quite a stream which flows for a distance of three miles and sinks in the sands of the desert. This location is peculiarly adapted for a storage reservoir of great capacity.

The Head Works of a Kern County Canal.

Our engraving shows important parts of one of the leading irrigating canals of Kern county, and gives the distant reader a little idea of the work undertaken to make the waters of our streams available for pushing the large crops usually secured from irrigated lands.

This canal appropriates 20,000 inches of water, equivalent to 400 cubic feet per second. Its location dates back to 1870.

The headgate and wastegate of this canal are the main features in the engraving. The former was built in 1878, and its construction required 75,000 feet of lumber. It is shown on the left of the engraving, and the wastegate is on the right; both are 50 feet in width. The wastegate is made to open from the bottom with chains, in order to flush the sand away from the headgate, which admits the water to the canal. The water through the wastegate goes back into the river. The water is brought to the headgate by means of a wingdam, shown in the foreground of the picture, and the amount taken into the canal is regulated, of course, by the raising or lowering of the wastegate. The water goes into the canal over the gate boards, thus preventing the sand from entering the canal.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents —EDS.

The Anaconda Mine.

Description of an Immense Property.

EDITORS PRESS:—This now justly celebrated copper mine was located by Hickey Bros. in 1876. Some time after its location they gave Chas. X. Larrable one-half to sink a shaft 50 feet on the vein. Then afterward Marcus Daly acquired one-third of the mine for doing some further development, and it did not attract much attention for several years. In November, 1880, Mr. Daly bonded the other two interests for $10,000 each, and went to work to thoroughly satisfy himself as to the worth of the mine, which thus far had been considered a silver prospect, and I have been informed that after the property was merged into the Anaconda Co., the first plant that was ordered for the property by that company was a complete dry-crushing silver-mill; but before they had it placed, the sinking ran into copper ore and they abandoned the silver idea.

The large three-compartment shaft was sunk to the 1000 foot level and stations out; crosscuts and levels run at each 100 feet, and a locality for a large reduction works was sought. The nearest point that was feasible was selected on Warm Springs creek, 22 miles southwest of Butte, and what was at that time considered a monster plant was placed with a capacity for handling 1200 tons daily. It was but a short time until the development of the mine showed such enormous ore reserves that they decided to increase their capacity to sufficient size to work 3000 tons daily. This was all decided and the preliminary work begun before the Secretan and his French syndicate began the bulling of the price of copper, which was then below 10 cents—a proof that the price of the red metal cut no figure with the capitalists who are behind the enterprise.

Their immense new smelter was about completed when a fire took place and the whole plant was consumed. What would have swamped an ordinary mining company was not considered by these gentlemen. They at once began to clear away the debris and place orders for the iron, and the smelter at Carroll is again in complete running order, and is now fire-proof, being wholly constructed of iron.

The old or upper works are now being gradually torn out and rebuilt of iron. When they are completed, the Anaconda will have the most extensive and the best constructed reduction works in the world. The question of cost has never been considered. When any machinery is placed, the only query is, Will it do the work, and will it give us better results at a lower cost of handling our immense output? If it will do this, they want it, whatever it may be, and in carload lots.

Large Operations.

The magnitude of this company's operations can scarcely be conceived by parties who are unfamiliar with large workings. Their shipments of copper during the past year amounted to over 30,000 tons. The estimate of the amount of silver in this is nearly 2,000,000 ounces, and the appreciated prices of this year will largely swell the gross product of the company.

The company have expended in development, purchasing mines and in their plant since November, 1880, to Jan. 1, 1890, over $24 000,000. It almost takes a man's breath away to think of the amount, but when the fact is considered that they use 75,000 tons of coal and a like number of cords of wood and 15,000,000 feet of lumber during a year, and that the railroads receive from the Anaconda Company in the vicinity of $1,000,000, the sum total is not so surprising.

Mine Development.

The Anaconda and St. Lawrence have not yet recovered their places as ore-producers since the fire of November, 1889, but by Sept. 1st everything will be in shipshape order. During all the time since the fire occurred they have kept their shipments up to about 1800 tons daily by increasing the output of the Chambers Syndicate mines, consisting of the Wake-up Jim, Wild Bill, Modoc, High Ore, Bell, Mountain Consolidated and Buffalo Diamond. These have all been developed from 500 to 1000 feet in depth and stations cut with crosscuts to the leads, levels run, man-holes put in, and everything is shaped up for extraction of ore whenever wanted in quantities to suit the requirements of their reduction facilities.

The Town Built Up

In the vicinity of the smelting works is a lively city of nearly 7000 people and sports all the modern improvements of the day—fine water works, lighted by electric lights, and the finest hotel building in Montana. There is nothing to compare with it between St. Paul and Portland.

The General Manager

And prime mover in this gigantic enterprise is Marcus Daly, who came into Butte with the second emigration or rather during the quartz excitement. For a time he operated in the interest of the Walker Bros., and during this time opened up the Alice mine and built the plant now crushing ore on that property. Becoming dissatisfied, he sold his stock in that company, resigned his position as superintendent and struck out to find a better thing as the saying goes, and he has certainly been successful in the superlative degree. He has looked after the company's many interests since that time in a most satisfactory manner. He has found time to improve an elegant home in Bitter Root valley, and has stocked his ranch with some of the finest horses in the land. Mr. Daly is certainly possessed of wonderful executive ability to be able to direct the development of the large group of mines and build the enormous plant now in operation by the company. It is fair to presume that a portion of his success may be attributed to his discernment in selecting his lieutenants, as but few changes occur in his official family. Mike Carroll went to work with him on the shaft that was sunk under the bond from Hickey & Larrabie, and he is still mining superintendent, and there are not many nooks and corners in the properties that Carroll is not familiar with.

The company has directly in its employ at the mines and smelters about 3000 men, and indirectly nearly as many more gain a livelihood, making it a heavy contributor to the general prosperity of the new State of Montana.

The Future Development

Of the properties is full of possibilities, but of ore reserves that are already open and capable of being measured up, they have many years' work in sight. The lead on the 1000-foot level is 21 sets of timber wide, all of which is mined and sent to the works at Anaconda. This will show what a mountain of ore they have to draw upon for their future supplies.

Rumors have been circulated at times during the past 12 months that an English syndicate was negotiating for the Anaconda properties, but no evidence can be obtained on the subject that can be considered authentic. The work of improving and completing their operations is carried on with the same vim and activity that has characterized their work from the beginning, and, to the general observer, would give the idea that they were preparing to produce copper and silver by the carload for the next century.

The management of the Anaconda Company are always on the alert for new properties, and when a new camp starts up, either in Montana or Idaho, they are sure to have representatives on the ground to look the field over, and if it promises well for the future, they will have bonds on a number of the prospects and always push the prospecting of a new camp along rapidly. They have ample means to put in machinery, and arrive at results in a few months that the original locators might struggle with for years and then have to forfeit their rights. They frequently have differences and troubles with the railroads on the matter of keeping up their supplies, and at one time it was thought that company would build and operate their own road from the mines to the reduction works. When the railroads see that they are taking chances of losing their best patron, they always come to time, and all goes serene for a time. The visitor who passes through Butte without taking a drive around and seeing the number of properties of the Anaconda Co., and the magnitude of their operations, and their concentrating, milling and smelting plant, has not seen the most interesting portion of a trip to Butte.

It is particularly unfortunate that it is necessary to keep the works so closely guarded, but it is, I presume, one of the necessities when such extensive operations are carried on to have none on the grounds except those who have business there, as persons going to and fro indiscriminately cause employes to neglect their duties while asking questions, and their only protection is to exclude them without fear or favor.

Refining Works.

The company has secured title to a large quantity of land at Three Forks, 70 miles east of Butte, with unlimited water-power, and it is said to be their intention to add a very extensive refining works, which, of course, will make a heavy reduction in their freight, as they ship their matte at about 65 per cent now, and the item of 35 per cent of a yearly output of over 30,000 tons is a large item of expense, and if they can refine it here, it will be another pay-roll in the interest of Montana. Each addition of this kind means continued prosperity assured.

The wants of the company in the way of general supplies for current use at the mines and works are purchased and distributed by the Butte Trading Company, a corporation within the Anaconda Co. Their volume of trade must be enormous, judging from the number of carloads of goods unloaded at their warerooms. The Montana Union switches are run into the hoisting works in order to deliver lumber and other heavy materials convenient for handling, and many thousand feet of lumber are kept on hand in reserve, in case of the railroad being blockaded or stopped from other causes. This description of the Anaconda mine and plant is rambling, but will serve to give the readers of the PRESS some idea of its vastness. The company being a close corporation, the best facilities are not furnished for writing the mine up in detail, and your correspondent has had to depend on many different sources for what information has been furnished. R. G. H.

Butte, Montana.

Copper in British Columbia.

EDITORS PRESS:—Prospecting work on the Victoria Copper Mining Claim has been in progress the last two months. This claim was located in 1889 by parties from Spokane Falls, Washington. The lode is six inches to three feet in width. The solid copper ore lays in deposits or chutes. The average assay is 60 per cent copper per ton; selected assay 65 to 75 per cent; also carries some gold and silver. The formations are syenite and granite. A shaft is being sunk on the ore chute, and at present depth the chute is increasing in size and quality of ore. The lode dips into the mountain at an angle of 45 degrees, and runs north and south. Solid pieces of copper weighing 100 pounds have been taken out near the surface. The intentions are to develop the claim thoroughly. C. BECKINGER.

South Fork of the Similkameen River, B. C.

Clarifying Water from Streams and Ditches.

EDITORS PRESS:—In a recent number of the PRESS the difficulties encountered in securing pure water, and the methods employed by the leading water companies, was ably written up and illustrated. This same difficulty was met and overcome by the miners of '49, and their experience may help to solve the problem of how to obtain pure water. The miner used the water in the mountain section where storms were frequent and severe; in consequence the wash from the hillsides and gulches soon filled his reservoirs and ditches. As a rule he was compelled to use water that carried all the tailings from a mine farther up the stream, and this had to be disposed of before it could be turned into another ditch. The '49er proved himself equal to the emergency in this as in everything else. Dams built across the ravines impounded the wash coming down from above. Headgates placed at different levels allowed the drawing off of clear water from the reservoirs. Where the sand filled into the ditches badly a slot was cut across the flume and a 2x4 placed back of it. Through this slot the sand dropped, and thus left the ditch free from accumulating sands where the mud or slickens was held in solution. Slum-boxes were built at the side of the ditch. The water, by means of gates, was turned into these slum-boxes, and at the lower end of the box turned out by another gate into the ditch. These boxes were about three feet lower than the bed of the ditch, and so acted as settling tanks. When nearly full the upper gate, which turned the water into the slum-box, was taken out of the flume and placed across the entrance to the slum-box; then a gate at the lower side of the slum box was opened and the slum either shoveled out or a stream of water was turned in sufficient to wash it out. These slum-boxes could be built in succession and the water settled until it was as clear as desired.

When in Dakota, in '80, the superintendent of the Homestake mine used the water appropriated by another, and although he restored it to the same stream, was sued for damages for fouling the water. He put in a series of slum-boxes, and when the case came up for trial, placed on exhibition a bottle of water taken from the stream at the point where his ditch diverted the water, and another bottle of water from the stream below where he discharged it from his slum-boxes. The court found that the water had been purified instead of befouled, as it was cleaner after than before using.

Murphys, Cal. E. H. SCHAEFFLE.

THE OPHIR.—The Ophir Mining Company shipped by the Virginia & Truckee railroad express train through Wells, Fargo & Co. last evening six bars of bullion valued at about $25,000, without the discount on silver deducted. Gold predominated over the white metal in the bars. This bullion is the returns from 883 tons and 1630 pounds of ore shipped to the Morgan mill and extracted from the Ophir mine in advancing the upraise above the 1465 level and following the ore developed there north and south, and in prosecuting explorations on the 1465 level. The returns show an average bullion yield of nearly $29 per ton. None of the ore developed in the winze below the 1300 level has yet been shipped; that extracted in exploring the extent of the development is temporarily stored on the 1400 level of the mine. The Ophir Mining Company since its incorporation has disbursed to shareholders $1 595,800 in dividends. The last paid was $1 per share, declared Jan. 12, 1880, out of ore extracted from the Hardy vein. The assessments levied by the company to date aggregate $4,210,640. The financial statement filed Aug. 1, 1890, showed a balance of $23 505.11 in the company's treasury on that date, which, added to the bullion shipment made last evening, makes a total of about $45,000 in the treasury, with the discount on silver deducted. Should further explorations demonstrate that the new ore development in the mine is as valuable as it promises to prove, another dividend at an early date is among the probabilities.—*Virginia Chronicle.*

RIVER MINING.—Says the Grass Valley *Tidings:* A young man who is engaged in river mining in the Yuba, working with a rocker, has averaged $6 35 in gold per day. An expert Indian, also with a rocker, has taken out as high as $16 a day. Next summer will see very active work in this line, and some big cleanups will be heard of. The amount of gold in the Yuba and its tributaries, washed down from the hydraulic mines, cannot be estimated, but it is known to be very large.

San Bernardino County.

Its Mineral and Other Resources.

NUMBER VIII.

[Written for the PRESS by JAMES H. CROSSMAN.]

Other Springs

In addition to those springs mentioned in my article of last week, the following are important as being situated on traveled routes or trails leading to the several mining districts. These are all in San Bernardino meridian except those otherwise indicated:

Black's Ranch Spring, Tp. 11 N., R. 3 W.
Dry Lake Spring, Tp. 11 N., R. 4 W.
Cottonwood Springs, situated in Tp. 9 N., R. 15 E.
Bonanza Springs, situated in Tp. 7 N., R. 16 E.
Chimehuevis Valley, on which occur several springs, the principal one of which supplies West's ranch. Its location is Tps. 4 and 5 N., R. 22 and 23 E.
Warren's Springs, Tp. 9 N., R. 3 E.
Warm Springs, near Newbury Station, Tp. 9 N., R. 15 E.
Willow Springs, Tp. 8 N., R. 12 E.
Surprise Springs, Tp. 2 N., R. 7 E.
Seven Palms, Tp. 1 N., R. 9 and 10 E.
Rabbit Springs, Tp. 5 N., R. 13 E.
Crystal Salt Springs, Tp. 5 N., R. 21 and 22 E.
Soda Lake Springs, Tp. 12 N., R. 8 E.
Borax Lake Springs, (Searles), Tp. 19 N., R. 7 W., M. D. M.
Hedden Springs, Tp. 18 N., R. 1 E.
Lone Willow Springs, Tp. 18 N., R. 46 E., M. D. M.
Salt Springs, Tp. 17 N., R. 8 E.
Leach's Point and Springs, Tp. 17 N., R. 3 E.
Granite Springs, Tp. 14 N., R. 42 E., M. D. M.
Kingston Spring, south end of Kingston Spring Mountain Tp. 21 N., R. 10 E.
Boiling Springs, on east border Dry Lakes, Tp. 20 N., R. 7 E.
Cronise Lake Springs, Tp. 13 7 E.
Furnace Creek Spring, its head forms the supply for Coleman Borax Works and Refinery, Tp. 26 N., R. 4 E.
Hidden Springs, Tp. 18 N., R. 1 E.
Bitter Springs, Tp. 13 N., R. 5 E.,
Marl Springs, Tp. 12 N., R. 13 E.
Crossman Springs, Tp. 17 N., R. 15 E.
Rock Springs, Tp. 11 N., R. 16 E.
Rabbit Springs, Tp. 4 N., R. 1 E.
Ludlow Springs, Tp. 9 N., R. 8 E.
Cove Springs, Tp. 8 N., R. 13 E.
Palm Spring, Tp. 1 S., R. 8 E.
Brown's Well, Tp. 5 S., R. 16 E.
Chuchawalla Springs, Tp. 7 S., R. 17 E.
Mule Spring, Tp. 7 S., R. 20 E.

This list of wells and springs, and their localities, though not of interest to the general reader, is of the utmost importance to the desert traveler.

Artesian, Pump and Curb Wells.

At the Amargosa Works in the Death Valley basin, a well has been sunk to a depth of 528 feet, using a seven-inch pipe. The discharge is 20,000 gallons in 22 hours, throwing the water above the curb 20 feet.

Four miles south from this point is a well sunk to a depth of 40 feet. From its bottom, when bored 40 feet farther, a flow of pure water came in so strong that the workmen were unable to put in pipe, and the water having no check or restraint, flows to the surface and overflows. The Calico dry lake, situated four miles north of Daggett, contains six wells on its northerly shore, from one-fourth to two miles apart, which average 100 feet deep and in which the water rises to a hight of ten feet in inexhaustible quantities. The water is pure and soft. The wells on the north shore of Lava Bed mountain, in a dry lake 35 miles east of Daggett, average 60 feet in depth. Water good and supply inexhaustible.

The wells of the Ludlow dry lake, eight miles north of Ludlow station, on the north shore, 80 feet deep, furnish an abundant supply of good water.

On the north shore of the Rabbit Spring dry lake, 18 miles northeast of Victor, a well furnishes an abundant supply of pure water; the same at Warrens and at Dry Lake, 40 miles east of Victor. Two wells over in New York valley, 35 miles north of Providence, at a depth of 14 feet; two at Black Ranch, 20 miles northwest of Barstow; one at Galena district, 30 feet deep, nine miles west of Oro Grande; Naelans well sink on the south shore of Death valley, three miles south of Saratoga springs; one well sunk five feet at Valley Wells, 37 miles southeast of Soda lake, all furnish an abundant supply. The above wells were all sunk on non-alkali soil. I find that the wells sunk on soil covered with alkali show the same result. For instance, at Soda lake, Warm Springs, Dry lake, etc., the water of all of the wells is found near the surface. At a proper depth there is no doubt but what artesian water could be obtained. That the soil possesses great qualities of fertility is demonstrated by the rank growth of several varieties of grasses and wild flowers whenever there is an unusual wet season.

Storage Reservoirs

We have already made reference to and described in part the immense storage systems that become necessary in order to render otherwise arid lands south of the San Bernardino range susceptible of cultivation. Suffice it to say, there are many available reservoir sites in the valley that have not as yet been utilized. The writer noticed one in particular 1½ miles east of Lyth creek in Sections 4 and 9, Tp. 2, N. R., and 4 and 9 N., R. 5 W., where a flat known as Lycem occurs consisting of 160 acres. At its outlet a dam 600 feet long by 75 feet in hight, with a base of 150 feet, costing not to exceed $15,000, would form a reservoir which, when filled from the surplus water of Lyth creek, would contain many million gallons of water. Its mean depth would be 40 feet.

Another catchment basin in the vicinity could be filled from the same source. The dam would be of the following proportions: 200 feet long from hill to hill and 100 feet high. This would flood an area of three quarters of a mile in length by 300 feet in width by 40 feet deep sufficient to irrigate 3000 acres. One miners' inch of water is estimated to be enough to irrigate six acres of land. Many of the ditches in this region are cement lined, bottom side and permitting an even flow of the water.

Water in ditches that are not cement-lined loses 50 per cent in eight months, while in cement lined ditches the loss is only by evaporation—not exceeding ten per cent.

The Santa Ana ditch is of this class. Its length is six miles. The dimensions are 4 by 6 by 3 feet deep, slope 55 degrees, cement lined.

Desert Regions.

North of the range, reservoir sites are also abundant. There are many places in this region where large areas can be utilized by short and inexpensive dams conserving and holding for man's use extensive bodies of water for irrigation purposes. This, with the resultant vegetation (trees and shrubbery), would assist Nature in reducing the temperature of the atmosphere many degrees.

Artesian Wells.

We have already shown that artesian water in immense quantities can be obtained in almost any portion of the desert region. Subterranean channels filled with pure, living water exist beyond a shadow of doubt at greater or lesser depths below the earth's crust, which serves as a blanket, protecting it from the desiccating effects and powerful rays of the sun. These channels form underground rivers constantly receiving fresh supplies from tributary streams and sources, the combined waters of which form the artesian belt of this region. In the immense superficial area of 14,340 square miles of territory that comprises the desert region, the subterranean waters are not confined to one channel, but there are many large branches or forks to the main arterial stream, which in themselves form rivers of no small proportions. The evaporating rays of the sun, though powerful, are not sufficient to take up but a very small percentage of the water that falls from the heavens even in an ordinary season, much less the unusual precipitation of the past year.

C. H. Fairchild, railroad agent of the Southern Pacific railroad, at Mojave, on the desert, who keeps a rain-gauge, furnishes the following data, which I reproduce in connection for illustration:

Precipitation, July 1, 1889, to Dec. 15, 1889	6.52
" Dec. 15, 1889, to Jan. 30, 1890	5.95
Season	12.47

This sea of water was not evaporated by the rays of the sun. The precipitation from Dec. 15 to Jan 30, 1890, was 5.95 feet. Thermometrical readings during that time showed a mean of 46 degrees Fahrenheit. Ice was often formed, the thermometer ranging from 30 to 62 degrees. What became of this water? It did not stand in pools, and had no surface-flow discharging into any visible stream that debouched into the ocean, but was absorbed by the sands of the desert passing into subterranean channels soon after falling, en route to the Father of Waters. Let the reader reflect a moment and use a few figures, and he will find that the down-pour of the aqueous fluid during that period, if conserved on the surface would form an inland lake, covering the whole desert regions, of sufficient depth to float a light-draft steamer.

Underground Rivers.

That waters of underground rivers, by the force of powerful hydrostatic pressure, find their outlet in the ocean through subterranean channels which form hermetically sealed tubes, is a well-attested fact. In the Atlantic ocean, off St. Augustine, Florida, immense springs of pure, fresh water spout up from amid the salt water at considerable distances from the shore. This phenomenon has been noted in many other places. Water, like other fluids, will find its level. It is these subterranean streams that form artesian belts. The desert regions of San Bernardino county contain a subterranean river of this character of immense proportions. These waters have been stored for man's use and can be brought to the surface by artesian wells, serving to fertilize and make productive more than four million acres of rich land.

I am well aware that this immense scheme cannot be accomplished by individual enterprise. No individual or combination of individuals have the requisite capital. It requires Congressional action and Government aid.

Senator Wm. M. Stewart and other far-seeing statesmen are enlisted in this cause and moving in the right direction. They are now advocating this measure in the halls of Congress.

In this article I have made but little reference to the extensive and elaborate system of storage reservoirs, artesian belt with its artesian wells, or other sources of water supply that lie south of the San Bernardino range of mountains, as I have made special reference to them in a previous article.

(*To be Continued.*)

Vegetable Fibers.

Shall we ever have the extraction of vegetable fiber by machinery brought to the point of success which will justify a farmer in growing a crop of ramie or other fiber plant? It is interesting to describe how well such plants thrive in this State and what vast sums the civilized world pays the barbaric producer, who works out the product by hand or with rude appliances, and is content with a few cents a day as wages. It is interesting, too, to read of the many fiber extractors and extracting processes which show fine samples and then offer the farmer a machine or a right to use a process for so many hundred or so many thousand dollars. Such offers do not constitute a practicable basis upon which to urge the production of these fibers in this country. The farmer cannot grow a crop of the fiber plant and then assume the labor and expense of manufacturing it into merchantable fiber before he can realize for his labor and the use of his land. To make the enterprise available the capitalist must buy the machines or the processes and carry on the extracting concern, contracting with the farmer to take his crude fiber green or dry at so much per ton, delivered at the factory or put aboard the cars or steamer. Just as soon as the proposition assumes this phase the farmers of the United States, or some of the States, will produce as much ramie or other fiber-yielding plant as can be profitably sold.

These facts must be recited because articles are now being published calling attention to the New Zealand flax industry and the large purchase of the prepared fiber in the United States. It is needless to send the seed to this country. The plants have been growing in this State for years and have been distributed nearly all over the State by the university. We know from the reports from widely distant experimenters just about in what districts of the State the plant will succeed. The old plants in Berkeley are seeding freely, and thousands of plants can be had by dividing the old clumps. Now, although all these things are so, who can conscientiously advise a farmer to lumber up his land with New Zealand flax, excepting a few plants which will yield him good material for tying vines, plant bundles, etc.? There is a very important step to be put in between the exhortation and the planting of the crop, and that is the work of the manufacturing capitalist who will provide proper machinery and offer the grower so much a pound, bale or ton for his crop as it comes from the field. Will this ever be done?

There is another fiber material which has been paraded for the last score of years as a possible source of great wealth to this State, and that is the wilderness of so called "wild hemp" on a portion of the Colorado desert. The subject comes forward anew in an article in the Yuma *Sentinel*, from which we quote as follows:

"On both sides of the Colorado river, from Yuma nearly to the Gulf of California, the wild hemp grows spontaneously in great abundance. The growth is perfectly wonderful, the stalk reaching a hight of from 20 to 35 feet, but averaging from 12 to 15 feet.

"This great fiber product or plant covers an area of not less than 50,000 acres, and the lowest estimate ever made places the annual yield of the clean or prepared fiber at 500 pounds per acre, or 25,000,000 pounds, equal to 12,000 tons, or 1250 carloads of ten tons each.

"It is estimated that to cut and prepare this for market will cost three cents per pound, or $750,000. A rate of freight to San Francisco of $7 per ton has been offered. The freight at this rate would amount to $87,500 annually. The harvesting of this amount of hemp would give employment to from 300 to 500 Indians for four or five months each year.

"Most of the fiber grows within two to four miles of the Colorado river, although in places it is found back from ten to 20 miles. It is mainly found among the arroyos or natural canals and lower land, which are overflowed or filled with water in the high waters of the Colorado. It can be cut, and the outside or woody matter can be removed by passing it through a brake similar to that used in the manufacture of flax. This can be done on the ground where the hemp grows, and thus save the hauling and freight of the extraneous matter, leaving only the fiber to be packed in bales and shipped.

"Using Indian labor, the fiber can be prepared, baled and transported to the Colorado at an expense not to exceed three cents per pound. Even supposing that the freight should reach $10 per ton to San Francisco, this would make the cost of production and delivery 3½ cents per pound.

"The lowest price offered for the prepared fiber delivered in San Francisco is five cents per pound, which leaves a profit of $30 per ton, or $375 000 for the crop per year at the lowest estimate of the yield in the poorest years. This offer has been made for the fiber in 10,000 ton lots, by an English company already engaged in the manufacture of rope, cordage-twine, sacks and matting.

"A wealthy German, engaged in the same industry, after having experimented with the hemp, made an offer of eight cents per pound in 10,000 ton lots, delivered at the mouth of the Colorado river or in San Francisco, which would leave a profit of $90 per ton, or $1,125,000 per annum. According to these figures, in the good years there would be expended for labor more than $5,000,000, for freight $800,000, with a profit of from $3,750,000 up to $10 000,000 per annum."

This is about the usual wild way in which this fiber industry is generally presented to the public. The tidings comes to the weary mechanic and fills his brains with visions of mechanical triumphs in extraction or to the ears of the poor farmer who longs for some crop which will pay him more money than he can secure by his present rotation. They all discover, after wasting much time and sometimes money as well, that the proposition is not yet upon a working basis, and that the articles are written either to win investment in some land scheme or some process scheme. We believe there will yet be profit in fiber production in this country, but it will not be reached until propositions assume more practicable forms than those in which they now usually appear.

Removing a Bar.

Mr. Joseph McGillivray, formerly of this city but now a resident of Liverpool, writes as follows to the Liverpool *Journal of Commerce* on a method of improving the harbor bar: I find from a map of the Mersey Docks and Harbor Board of last year's soundings of the part known as the Liverpool bar, that the water at low spring tide is only ten feet, and at a point and on a line 300 yards north of and parallel with the line between the Bar Lightship and the Formby Lightship; that the distance across the bar, from 18 feet depth inside to 27 feet depth outside, is 1800 feet, outside of which there is ample depth of water and plenty of space to deposit sand from off the bar. My plan to deepen this part is by assisting the current to scour out a channel through the 1800 feet, bringing it down, at least, to the 18 feet inside. The reason why I take the depth from 18 feet to 27 feet is in order to have grade to assist the current to carry out the sand. My plan would be to get a set of gang-plows attached to a V-shaped frame, drawn by a tow-boat, turning over and entirely loosening the sand, which the last of the ebb tides would carry out and which could be assisted by the use of force-pumps stirring and driving the sand. Also the slickings from the docks could be let down on it from the hoppers in quantities, which would materially assist in moving the sand along with it; also by temporary guides, forming lines on which the current would act. On making a plan of the bar, I find from the different depths, and to do the work by sections, in order to get as much grade as possible to work on, that from the point section 1, at which the water is 10 feet to the 27 feet, a distance of 900 feet, there is a grade of 17 feet, or 1 foot to 53 1 17; that section 2 from 12 feet to 27 feet, distance 1200 feet, grade of 15, equaling 1 foot to 80 feet; sections 3, from 14 to 27 feet, distance 1500 feet, grade of 15 feet fall, equaling 1 to 115 3 5. No. 4, 18 ft. to 27, distance 1800 ft., 9 ft. grade, equaling 1 to 200. The best result would be got on the last runs of the spring ebbs, as with the least depth of water the greater would be the scour, and the action of the tide outside the bar from the 27 feet, with the great area, would scatter the sand out of the way. My knowledge of the action of water on material in sluices, as well as in rivers, has been derived from a varied experience in the gravel mines of California, and I fully believe that by following the substance of the above principles, with probable additions which might suggest themselves as the work went on, and with the large quantity of water which comes in and out of this large basin, that by assisting Nature the bar can not only be materially lowered, but can with little help be kept deep enough to enable the largest ships to enter at all times, except, perhaps, at extreme low tides, keeping Liverpool as it is—the first port of the world. In conclusion, I may just add that the plant for carrying out the scheme above suggested would cost but little, the services of a tow-boat being the principal.

Silver and Produce Values.—The course of silver since the recent active favorable legislation is of interest as related to produce values. In August, 1889, silver was quotable at 92½c per oz. in New York; now the quotation is $1 19⅞ per oz., an advance of 27⅜c per oz. This means that a miner having an output of 100,000 ozs. would only have received for it last year $92,500, against $119,875 this year, which gives the mine-owners $27,625 more money to spend or loan out. The more money there is, the cheaper the rate of interest and the higher are farm products, and providing the amount of money does not exceed legitimate needs, and has a good basis of value in itself, the more prosperous are our producing interests.

Butte County Mines.—According to the Oroville *Register* there is more activity in mining properties in Butte than for many years past. The sale of the Greek mine and of the old Cape claim was consummated and the money paid on Saturday last to the various owners. The rich returns from the Forbestown mines are attracting capital, and a number of new ledges give fine indications for the future. The Patterson gravel mine, near the famous Carr mine, is paying from $8 to $50 a day for four men. The Carr mine is known to be very rich. The Reese mine, owned by Messrs. Reese, Walker & Smith, is being opened by a tunnel. The amount of gold shipped from this town is not less than $25,000 a month, while the shipments by private parties, mostly Chinese, are very large.

Southern Nevada.

Mr. James Delavan, mine-census agent, writes to the Virginia *Enterprise* as follows:

One of the greatest improvements made to facilitate the settling and opening up of the western portion of this State was the building of the Carson & Colorado railroad from the Mound house to the State line, in Esmeralda county, and thence on southerly through Owens River valley to Keeler, in Inyo county. The country through which this road passes was almost inaccessible until the railroad was built. Much promising and really valuable mining country lay dormant, or was so remote from sources of supplies that no mining could be carried on at a profit, and capital could not be induced to venture into those remote regions. But now all this has been changed by the construction of the railroad, and since its completion, many new mining districts have been formed, and mines have been opened and worked, whose product adds much to the wealth of the country. This is especially the case in Esmeralda county, Nevada, and Inyo county, California.

Among the number are the mines in Garfield district, lying west of Luning, on the railroad, and the Santa Fe mines, to the east of Luning. There are mines in Marietta district, west of Belleville, from which place ores are shipped to San Francisco, where they are sold to the Selby Reduction Company. There are ores of different characters in the districts; some are free-milling, containing mostly gold. The railroad facilities make it possible to work many mines in Columbus district that otherwise could not be worked at a profit; also in Silver Peak, Lida valley, Montezuma, Palmetto, Sylvania and other districts in the southern part of Esmeralda county.

In Inyo county, Cal., mines are located and are being developed, some of which are quite promising, that would never have been heard of if it had not been for the Carson & Colorado railroad.

The mines at Cerro Gordo, some of which have been large producers, were worked a number of years ago, when all supplies were carted in from Los Angeles, 300 miles distant. All of the silver-lead bullion was sent to Los Angeles for shipment to San Francisco at great expense for transportation. None but the richest mines could be worked at a profit with all the attending expense of transportation of supplies and conveying the bullion to market.

Now all that has been changed by the building of the Carson & Colorado railroad, and work has been resumed in the mines of this district, with a prospect that they will now be worked at a profit, and many that could not be profitably worked before the building of the road will be made to pay good profit. Cerro Gordo will undoubtedly become a lively camp. The mines in Darwin and other districts below the present terminus of the railroad are also receiving renewed attention since facilities are such that they can now be worked at a profit.

The borax, salt and soda marshes are now producing largely, since the expense of transportation does not consume all the profits, as formerly was the case.

Mines in Hawthorne district have been opened, and have been and are now being worked to quite an extent, creating much business for the town of Hawthorne and the railroad.

Dr. Yates' Publications.

Dr. Lorenzo G. Yates, the well-known scientist of Santa Barbara, is not only an officer of their local Natural History Society and a a corresponding member of the S. F. Microscopical Society, and of the Washington Anthropological Society, but also claims membership in the American Horticultural Society, American Association of Conchologists, and Geological Society of America; nay more, his scientific associations extend over the sea to the New Zealand Institute, and the Linnæan and Philosophical Societies of London.

Dr. Yates has published a variety of works, which may be ordered of him at Santa Barbara, Cal., as follows:

The California Digest of Masonic Law, 8vo., 236 pp., cloth, 1867. $1.50. Postage extra.

Catalogue of the Ferns of N. America, 8 pp., 1886 25 cts.

Notes on Hawaiian Ferns, 15 pp., 30 cts.

The Ferns of Ceylon, 33 pp., 40 cts.

Catalogue of Minerals in L. G. Yates' Collection, 71 pp., 50 cts.

Catalogue of Fossils in L. G. Yates' Collection, 37 pp., 25 cts.

Catalogue of Indian Relics in L. G. Yates' Collection, 4 pp., 10 cts.

Catalogue of Land and Fresh Water Shells, (Foreign), 40 pp.

Catalogue of Land and Fresh Water Shells (American), 47 pp.

Catalogue of Marine Shells (American), 30 pp.

Catalogue of Marine Shells (Foreign), 51 pp.

Charm Stones ("Indian Plummets") with 4 plates of 31 illustrations. Price on application.

All Known Ferns (just ready), a book of reference, giving the name, habitat and synonyms of all known ferns of the world; with references to other works. Synopsis of Genera and divisions; Bibliography of Ferns: Key to Genera, etc. Bound in cloth. Price, $3.50; postage extra; or with blank pages for notes and additions, $4; postage extra.

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San Bernardino County.

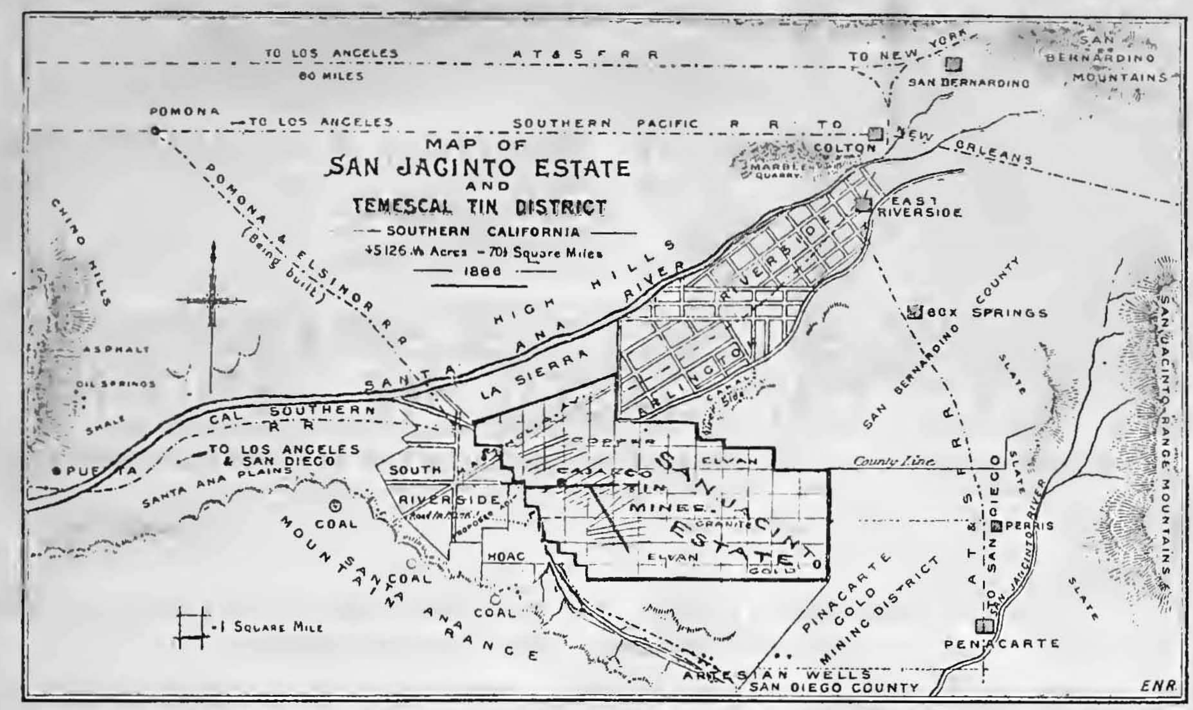
Its Mineral and Other Resources.

NUMBER IX.

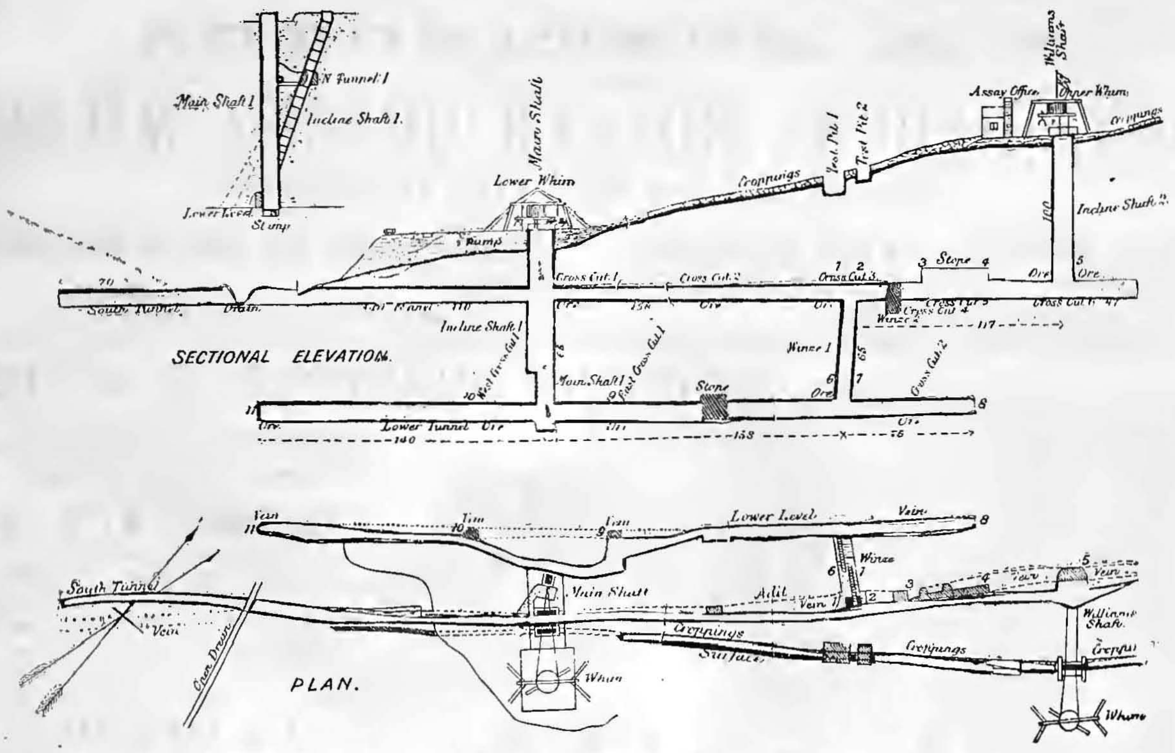
[Written for the Press by James H. Crossman.]

Temescal Tin District.

On entering this county from San Francisco via Los Angeles, the first mining district that is called to the writer's attention is that of the Temescal tin district. It is situated on the southwest portion of the Rancho Sobrante de San Jacinto, a Mexican grant. The San Jacinto estate now comprises an area of 45,126 acres, or 70½ square miles. The tin district proper has a superficial measurement of 23 square miles, or 11 miles in length S. E. and N. W. by two miles in width. It is situated 55 miles easterly from Los Angeles.



MAP OF SAN JACINTO ESTATE AND TEMESCAL TIN DISTRICT, SAN BERNARDINO COUNTY.



PLAN AND SECTION OF THE CAJALCO MINE, TEMESCAL TIN DISTRICT, SAN JACINTO ESTATE, CALIFORNIA.

The district contains numerous metalliferous veins carrying ores of tin, copper, gold and silver in paying quantities. Tin being the predominating metal, I will first describe the formation and occurrence of its ores.

San Bernardino county is the only known locality on the Pacific Coast that contains ores in place of this valuable metal. Its domain is in the Temescal range of mountains and its zone proper is bounded on the north by the Santa Ana river and valley; on the south by Temescal creek, which separates it from the Santa Ana range; westerly by the Santa Ana plains and easterly by the San Jacinto river. This includes an area of 12 miles in length S. E. to N. W. and four miles in width, in which occur over 60 known and well-defined veins of tinstone. These vary in width from four to six feet, and some of them carry ores of a high grade in the form of tin oxides (cassiterite). These veins, in the aggregate, extend on their line of strike 35 miles. The ores of these mines are remarkably free from any base that prevents their easy reduction and concentration or that debases the metallic product. The average yield is 15 per cent of black metal, which will return over 66½ per cent of pig tin from the furnace. The principal, and in fact the only well-developed mine in the district at present, is the

Cajalco Mine.

This was first exploited in 1868. Its ores for a test were reduced on a small scale, yielding metallic tin from which tin-plate was manufactured in sufficient quantities in this city to prove their great value and ease of reduction. Litigation ensued and in 1870 all work was suspended, which state of affairs continued until March, 1888, when the title was confirmed on an appeal, the Supreme Court of the United States settling for all time the validity of the title in the present company. During this lapse of time the public had forgotten the existence of this valuable deposit and ceased to wonder why it was not being worked, and at date very few realize that we have in our State a "treasure trove" that will soon fill a much-needed want. Last year our importations from England amounted to over 430.000 tons of tin-plate, equaling over 5,500,000 boxes of tin and terne plate, upon which a duty in excess of $5,500,000 was collected by the United States, to say nothing of the first cost of the material. The Pacific Coast alone consumes 30,000 tons per year in canning industries. The imports of pig tin into the United States last year were 20,000 tons.

There can be no question but that the mines of Temescal district can, when in active operation, supply the demand and support an army of operatives. Tin will be produced and extensive tin-plate manufactories will soon probably be erected at some central point accessible to trade centers. The extraordinary high grade of the ores of the Temescal veins, compared with tin ores that have for so many hundred years been worked profitably in Cornwall, renders it an assured fact that work of development will soon be profitably inaugurated. In Cornwall, ore that only yields 2½ per cent metallic tin is considered far above the average and pays large dividends to the producer. The poorest ores of the Temescal district yield a much higher result, and are, moreover, entirely free from the bases that deteriorate the Cornish ores. I confidently predict that the day is not far distant when San Bernardino will be to the United States what Cornwall is to Great Britain.

Geology.

The axis of the mountain range that lies east of Temescal creek, in which the tin-bearing zone occurs, is a secondary granite. It rises to an elevation of from 500 to 700 feet above the bed of the creek and 1280 feet above the level of the sea. Its granitic central core (which is four miles in width) is flanked on either side by belts of a hard dark-colored porphyry about 1½ miles wide, which changes in both texture and color as it approaches the metal-bearing (granite) material. The colors vary from gray to white, and when in near proximity to the granite, assume a rose-red tinge. This discoloration is probably owing to iron or some other metallic oxide. This rock is technically designated by the Cornish tin miners as an elvan course, composed of quartziferous porphyry, which invariably skirts and accompanies the peculiar granitic formation that incloses the tin-bearing lodes. The granite of this district is identically the same, both in crystallization and mineral contents, as that in which the tin mines of Cornwall occur. The belt on its southeasterly course intersects the coal, asphaltum and oil bearing slates and shales of the Santa Ana range, and disappears—a notable feature.

The tin-bearing lodes are strictly confined to this granitoid rock, while the adjoining elvan courses and porphyritic rocks are seamed and fissured with veins carrying metals of copper, gold and silver, with occasionally a small percentage of tin. In this mineral zone are found more than 60 tin-bearing veins lying parallel with each other, coursing at nearly a right angle with the strike of the granitic belt. These veins in the aggregate represent an extended length of tin-bearing lodes of not less than 35 miles, coursing northeast and southwest, while the trend of the granitic and porphyritic belt is southeast and northwest, proving beyond controversy their character as *true fissure* veins, which in all probability go to the deep. They dip northwesterly at an angle of 65 degrees from the plane of the horizon.

The Tin-Bearing Lodes Proper

Of this district are known as the northwest group. The southeast group is situated 1300 feet distant, but carries an entirely different class of ore—gold, silver and copper predominating. Taking the principal tin mine, the Cajalco, as a central point, 700 feet northwesterly from the main shaft, a well-defined vein of tin ore occurs; 75 feet southeasterly a strong line of croppings show a promising vein of 325 feet in the same direction and the tin-bearing vein occurs, showing a long line of croppings which give high assays. Also in the same course three parallel veins are encountered, and at a distance of 600 feet the Little Scotty is seen with an incline shaft 15 feet deep sunk on a rich body of tin ore.

Samples of this ore show 20 per cent black tin. Six hundred feet southeasterly from the last-named vein, heavy croppings occur, which have been opened by a 10-foot shaft, the ore containing both copper and tin. The color of the latter changed from a brownish-red to a light-gray and bright rose color. The district extends about 1½ miles southeasterly from the last-named mine. In this distance 17 well-defined veins occur carrying tin-bearing ore. The principal development in this district has been on the Cajalco, one of the mines of the northwest group. Its course is north, 30 east, magnetic, with a dip of 74 degrees northwesterly. The vein crops boldly, showing an average width of 30 feet, and is traceable for a long distance. Lying parallel and within a distance of 300 feet, heavy croppings of other veins come to the surface.

Developments.

At a point in a ravine 140 feet below the summit an adit-level has been driven northeasterly 432 feet, from which surface connections have been made by two shafts, and winzes sunk to a lower level. The workings show a width of six feet, with a rich chute of tin ore 200 feet long, leaving an eight-foot vein of rich ore in the bottom of the mine. No crosscuts have been driven. The total work of development in the aggregate equals 1186 feet of shafts, tunnels, drifts and winzes. For particulars of developments, reference is made to the accompanying plan and section. In the plan and section, the numbers 1 to 11 are points of photographic views of lode taken by flash light, showing width and character of vein.

Silver, Gold and Copper.

About one mile from Temescal Creek and 3000 feet northwesterly from the Cajalco mine a group of silver and gold bearing veins occurs. One of these claims shows a width of eight feet. On this vein the work of development has been confined to a few open cuts. From the ore exposed a number of samples were taken. As an average, the following assay results were obtained: Silver, 165 ounces per ton; gold, $7.50; copper, 15 per cent.

Gold Mines.

The Gabilan mine is situated in the southeastern portion of the San Jacinto estate and seven miles from the Cajalco mine. Its strike is northerly and southerly; dip 70 degrees easterly; formation, porphyritic granite; gangue, quartz; strength of vein from two to four feet, two feet of which has paid by mill process $50 per ton. Some $250,000 had been extracted when litigation ensued and work was suspended. This mine has been developed by an incline shaft 400 feet deep, with levels run north and south for a distance of 350 feet. The concentrates assay from $200 to $7000 per ton. Work on the mine will be resumed at an early date.

Fireclay.

The district also contains a superior article of fireclay in great abundance, which is suitable for terra cotta and porcelain.

Pottery works have been established on an extensive scale, and are in full operation at South Riverside. Work is confined, however,

(*Continued on page 162.*)

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, Sept. 4, 1890.

General trade shows a steady increase; a large business is looked for the coming week, owing to an influx of buyers to take part in the Admission-Day celebration.

The local money market is gradually growing in ease under freer remittances from the country and more confidence felt by capitalists in the future.

MEXICAN DOLLARS—The market has held strong throughout the week at 92@92½ cts.

SILVER—The local market has been quoted by the Mint at $1.18½, while local speculators bought at $1.19, with, at times, paying a slight advance. The bulk of that held here has been placed. By comparing the prices given below with the daily quotations furnished to the New York press, as given under our Eastern Markets by telegraph, it will be seen that the Department at Washington pays quite an advance for direct offers. On Aug. 29th the offers of silver to the Government amounted to 1,353.000 ounces. The amount purchased was 100,000 ounces at $1.1949 and 158,000 ounces at $1.1975. The majority of the offers were at very high prices. On Sept. 1st the amount of silver offered to the Treasury Department was 1,215,500 ounces, and the acceptances were 15.500 ounces at $1.19¼, and 135.000 ounces at $1.19½, or 150.500 ounces in all. The total amount purchased since Aug. 13th, the date when the present law went into effect, is 3.504,000 ounces, leaving but 996,000 ounces to be purchased between now and the 13th inst. On Sept. 3d the offers of silver to the Treasury Department amounted to 2,003.500 ounces. The amount purchased was as follows: One hundred thousand ounces at $1.19¼; 200,000 ounces at $1.19½.

QUICKSILVER—Receipts the past week aggregate 197 flasks. The market remains steady at unchanged quotations.

ANTIMONY—The market is weaker at the East and also in this city. A shipment of 8735 pounds was made the past week to New York.

BORAX—Receipts the past week aggregate 941 centals. The Pacific Borax Co. will ship by the J. B. Thomas 2000 ctls. to New York. The market is steady at current quotations.

LIME—Receipts the past week aggregate 2628 bbls. This shows quite a falling off. The near approach of winter is an unfavorable influence on the market.

TIN—Imports the past week aggregate 2461 ingots from Australia and 8468 boxes from Liverpool. The market locally is easy, but for shipment plate is strong, with no concession obtainable. The advance in silver is in favor of holders.

IRON—Imports the past week aggregate 100 tons from Oregon. The market is firm, with a more general consumption reported. Some shipments are being made up north. Both English and Eastern advices are favorable to higher prices, for the demand is reported active, with many furnaces sold well ahead.

COPPER—The market is strong. Mail advices from the East report sales for future delivery at over 17c for Lake. The consumption in America and also in Europe is large, being slightly in excess of the output of the mines.

COAL—Imports the past week aggregated as follows: Sydney, 1945; Coos bay, 1150; Hiogo, 1850; Tacoma, 4296; Overland, 20. Total, 9261 tons. Carbon Hill is again in market. A fine sample from Alma, Wyoming, is on the market. The market is very strong at the recent advance. The buying for household purposes has been quite free; many are laying in their winter supplies. Some larger dealers look for still higher prices for Australian, while others again think that there will not be another advance soon. Ships are being loaded in Australia, while free shipments are being made from England. The Puget Sound collieries are increasing their output.

Eastern Metal Markets.

By Telegraph.

NEW YORK, September 3.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	54⅓	1 18¾	$16 75	$4 72½	$22 10
Friday	54½	1 19	16 80	4 72½	22 10
Saturday	54⅝	1 18¾	16 80	4 72½	22 10
Monday	54½	....	.....	....	.....
Tuesday	54½	1 18¾	16 75	4 80	21 85
Wednesday	54⅝	1 18¾	16 75	4 82½	21 85

NEW YORK, September 2.—Borax not largely wanted; 9@9½c; refined and powdered, no new business. Crude Sperm Whale out of stock. Lake Copper strong, first hands, 17c; Arizona, 15½c; casting brands plenty, 14½@14¾c. Pig Lead held stiff at $4.80; $4.70@4 75 bid. Sales light.

Coal.

TO LOAD.	Per Ton.	SPOT FROM YARD.	Per Ton.
Australian	$ 8 00@$8 50	Wellington	$ 9 00
Liverpool St'm.	8 00@ 8 25	Greta	11 00
Scotch Splint.	8 25@ 8 50	Carbon Hill	7 00
Cardiff	8 50@— —	Nanaimo	9 00
Lehigh Lump	15 50@17 00	Sydney	9 50 @10 00
Cumberland hk	13 50@— —	Gilman	9 50
Egg, hard	15 00@— —	Seattle	9 50
CANADIAN ANTHRACITE COAL.		Coos Bay	7 00
		Cannel	12 00
Egg, ship side	$12 50	Egg, hard	10 00
Egg, yard	15 00	Cumberland, in sacks	16 00
Stove, yard	15 00	do. bulk	15 00
Nut, yard	15 00	Wallseud	9 00@ 9 50

Sales at San Francisco Stock Exchange.

THURSDAY, Sept. 4, 9:30 A.M.

Shares	Company	Price
450	Alpha Con	1.25@1.30
50	Alta	1.05
450	Andes	1.25@1.30
150	Belcher	3.25
100	Bodie	1.20
300	Bullion	2 75
200	Bulwer	25c
250	Challenge Con	2.45
100	Chollar	3.35
100	Con.Cal.& Va	4.95
15	Confidence	5.50
100	Con. Imperial	40c
300	Crown Point	2.80@2.85
500	Exchequer	1.05
100	Gould & Curry	2.30
300	Hale & Nor	2.50@2.65
200	Hendricks	40c
800	Julia	35c
150	Kentuck	1.55
300	Lady Washington	65c
100	Nevada Queen	80c
250	Occidental	1 05
200	Ophir	5.12½
150	Overman	2.20@2.25
200	Peer	10c
200	Peerless	10c
300	Potosi	6.75@6.87½
70	Savage	3.90
200	Scorpion	35c
100	Seg. Belcher	1.40
50	Sierra Nevada	2.90
100	Silver King	50c
200	Utah	80c
100	Weldon	10c
250	West Comstock	60c
300	Yellow Jacket	3.40

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta M Co	Nevada	39	50	Sept 1	Oct 7	Oct 29	L Osborn	309 Montgomery St
Best & Belcher M Co	Nevada	47	25	Aug 21	Sept 25	Oct 17	L Osborn	309 Montgomery St
Cons Imperial M Co	Nevada	28	5	July 17	Aug 20	Sept 11	C L McCoy	329 Pine St
Gover M Co	California	2	25	July 15	Aug 20	Sept 6	Gray Dew	13 and 15 Fremont St
Gray Eagle M Co	California	19	5	Aug 25	Sept 29	Oct 20	J M Buffington	303 California St
Guascaran & California M Co	Honduras	2	10	Aug 12	Sept 20	Oct 8	E Oliver	22 Montgomery Ave
Humboldt M & M Co	Nevada	1	1	Aug 16	Sept 29	Oct 25	J C Ruddock	35 New Montgomery St
Kentuck M Co	Nevada	22	30	Aug 18	Sept 22	Oct 14	J W Pew	310 Pine St
Locomotive M Co	Arizona	8	5	Aug 13	Sept 18	Oct 6	A H Fish	309 Montgomery St
Mayflower Gravel M Co	California	48	20	Aug 5	Sept 6	Sept 29	J Morizio	328 Montgomery St
Occidental Cons M Co	Nevada	7	28	Aug 5	Sept 11	Oct 7	A K Durbrow	309 Montgomery St
Peer M Co	Arizona	9	10	Aug 7	Sept 12	Oct 3	N T Messer	309 Montgomery St
Peerless M Co	Arizona	15	15	Aug 14	Sept 23	Oct 14	A Waterman	309 Montgomery St
Teresa M Co	Mexico	2	5	Aug 13	Sept 18	Oct 8	A Chemmant	328 Montgomery St
Trojan M Co	Nevada	19	10	July 10	Aug 23	Sept 8	M L Templeton	533 Kearny St
True Cons M Co	California	9	2½	May 25	July 21	Sept 15	J C Bates	434 California St
Union Cons M Co	Nevada	41	28	July 21	Aug 26	Sept 15	A W Barrows	303 California St
Utah Cons M Co	Nevada	10	25	Aug 5	Sept 15	Oct 2	A H Fish	309 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY	OFFICE IN S. F.	MEETING	DATE
Con Golden Gate Sulphuret M Co	Cal.	F B Oliver	320 Sansome St	Annual	Sept 11
Grand Prize M Co	Nevada	R R Grayson	327 Pine St	Annual	Sept 16
Gray Eagle M Co	Nevada	A W Barrows	303 California St	Annual	Sept 17
Inyo Marble M Co	California	G W Luce	132 California St	Annual	Sept 12
Mono G M Co	California	B L Burling	309 Montgomery St	Annual	Sept 18
North Occidental M Co	Nevada	W H Watson	304 Montgomery St	Annual	Sept 9

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F	AMOUNT.	PAYABLE
Candelaria Cons M Co	Mexico	G Gale	309 Montgomery St	25	Aug 22
Caledonia M C	Nevada	A S Cheminant	328 Montgomery St	08	July 15
Con California & Va M Co	Nevada	A W Havens	309 Montgomery St	25	April 10
Derbec Blue Gravel M Co	California	T Wetzel	522 Montgomery St	10	May 25
Eureka Cons M Co	Nevada	H P Bush	306 Pine St	25	Aug 5
Idaho M Co	California		Grass Valley	2 50	Mar 7
Pacific Borax Salt & Soda Co	California	A H Clough	230 Montgomery St	1 00	Sept 11

San Bernardino County.

(Concluded from page 159.)

at present to the manufacture of pipe, tiles and firebrick, which are said to be equal to the imported article.

Stone and Coal

For macadamizing purposes, a hard, dark-colored porphyry, occur three miles northwesterly from the Cajalco mine on the San Jacinto estate. A quarry has been opened, and the product is being extensively utilized for paving purposes, particularly in Los Angeles. A short distance below the quarry, reduction works have been erected and are in operation for breaking the rock to a proper size for street purposes.

A coal measure of unknown extent for value is being exploited in this section. Limestone also occurs.

Water Supply.

Water, that important factor for the successful working of metalliferous ores, particularly ores of tin that require concentration, is supplied in efficient quantities for all practical purposes in Temescal creek, which runs along and upon the western portion of the ranch. In the driest season at least 400 miners' inches flow in the creek, with large reserves percolating through the sandy and gravelly formation of its bed. A submerged dam from the bed-rock up would much more than quadruple the flow. This, if raised to a hight of from 15 to 20 feet above the surface, would create an artificial lake, from which a very large and permanent supply of water could be secured not only for an extensive water-power, but for irrigation purposes for large areas of agricultural land equal to any in Riverside, which is in the vicinity, and where water for irrigation can be procured, the land sells for high prices.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Aug. 14.		WEEK ENDING Aug. 21.		WEEK ENDING Aug. 28.		WEEK ENDING Sept. 4.	
Alpha	1.00	1.20	1.10	1.20	1.15	1.30	1.10	1.25
Alta	.95	1.05	1.05	1.15	1.05	1 20	.90	1.15
Andes	.50	.55	.50	.70	.70	1.25	1.10	2.35
Belcher	2.70	3.15	2.80	3.10	3.05	3.30	3.05	3.15
Best & Belcher	2.75	3.10	2.85	3.15	3.15	3.50	3.30	3.70
Bullion	2.20	3 10	2.20	2.70	2 50	3.05	2.35	2.75
Bodie Con	.90	1.15	.95	1.30	1.25	1.55	1.20	1.45
Bulwer	....	....	.20	.25	.25	.30	.25	....
Commonwealth	2.95	3 05	2.50	2 70	2.55	3.05	3.00	3.10
Con. Va. & Cal	3.50	3 8[illegible]	3.55	4.1	4.05	5.00	4.50	4.95
Challenge	1.90	2 25	2.05	2.20	2 20	2.40	2.20	2.35
Chollar	2.40	2.70	2.45	2.70	2 70	3.45	3.10	3.35
Confidence	5.00	5.75	5 00	....	5.00	5.50	5.37	....
Con. Imperial	.30	.35	.30	.40	.40	....	.40	....
Caledonia	.25	.40	.30	....	.35	.45	.45	.50
Crown Point	2.20	2.75	2.40	2.55	2 55	2.85	2.55	2.85
Crocker	.25	....	.20	....	.15	.25	.20	.25
Del Monte	1.00	1.35	....	....	1.20	....	1 20	....
Eureka Con	3.95	4.25	4.00	4.25	4.50	4.90	....	....
Exchequer	.50	.80	.75	.95	.85	.95	.90	1.00
Grand Prize	.25	.30	.30	....	.25	.35	.30	....
Gould & Curry	1.75	2.15	1.85	2 30	2 25	2.45	2.15	2.45
Hale & Norcross	2.05	2.60	2.15	2.60	2.45	2.90	2.35	2.70
Julia	.15	.20	.20	.25	.25	.30	.25	.30
Justice	1.20	1.40	1.30	1.35	1.35	1.40	1.40	....
Kentuck	.85	1.05	.90	1.05	.90	1.10	1.15	1.50
Lady Wash	.30	.35	.30	.35	.30	.40	.45	.70
Mono	.35	.40	.40	.40	.60	.70	.50	.50
Mexican	2.85	3.15	2.85	3.20	3.10	3.45	3.05	3.45
Navajo	....	....	....	....	....	...	.40	.45
North Belle Isle	1.00	....	1.05	....	1.10	....	1.05	1.15
Nev. Queen	.60	.70	....	....	.75	1.00	.90	....
Occidental	.75	.90	.80	.90	.90	.95	.90	1.00
Ophir	4.35	4.95	4.50	4.70	4.55	5.25	4.75	5.25
Overman	1.35	2.05	1.90	2 20	2 10	2.25	2.15	2.25
Potosi	5.25	5.62	5.50	5.50	6.12	7.37	5.00	6 62
Peerless	.15	.20	.10	.15	.10	....	.10	....
Peer	.10	....	.10	....	.10	.20	10	.15
Savage	3.10	3 50	3.40	4.30	3.55	4.20	3 55	4 20
S. B. & M.	1.05	1.25	1.20	1.30	1.25	1.50	1.35	1.50
Sierra Nevada	2.40	2.75	2.55	2.75	2.55	3.15	2.80	2.90
Silver Hill	.20	.25	.25	.30	.25	.30	.30	.40
Scorpion	15	.20	....	....	.20	.25	.25	.30
Union Con	2.25	2.60	2.35	2.50	2.85	3.10	2.80	3.00
Utah	.55	.65	.60	.65	.65	.80	.75	.85
Yellow Jacket	2.80	3.30	3.00	3.20	3.15	3.50	3.25	3.40

DIVIDEND NOTICE.

OFFICE OF THE PACIFIC BORAX, SALT and Soda Company, San Francisco, August 30, 1890. At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 35) of One Dollar ($1.00) per share was declared, payable WEDNESDAY, September 10, 1890, at the office of the Company, No. 230 Montgomery Street, Rooms 11 and 12. Transfer Books close September 5, 1890, at 3 o'clock P. M.

F. B. PRITCHARD, Secretary pro tem.

Engraving. Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of this paper.

Assessment Notices.

GRAY EAGLE MINING COMPANY—Location of principal place of business, San Francisco, California. Location of works, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 25th day of August, 1890, an assessment, No. 19, of six (5) cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States gold coin to the Secretary, at the office of the Company, Room 11, No. 303 California street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 29th day of September, 1890, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 20th day of October, 1890, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. BARROWS, Secretary pro tem.

Office, Room 11, No. 303 California Street, San Francisco, California.

DELINQUENT NOTICE.

GOVER MINING COMPANY—LOCATION of principal place of business, City and County of San Francisco, California; location of works, near Drytown, Amador county, California.

Notice—There are delinquent upon the following described stock, on account of Assessment (No. 2) levied on the 14th day of July, 1890, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Cert.	No. Shares.	Amt.
Wheeler, W A	53	1,100	275 00
Pratt, Freeman	95	50	12 50
Small, John C	96	1 066	266 50
Trefethen, George	99	500	125 00
Sanborn, Helen P	101	250	62 50
Dyer, S C	102	200	50 00
Parsons, C A	103	200	50 00
Stone, N I	142	3,000	750 00
" "	155	2,000	500 00

And in accordance with law, and an order of the Board of Directors, made on the 14th day of July, 1890, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, Nos. 13 and 15 Fremont street, San Francisco, California, on SATURDAY, the Sixth day of September, 1890, at the hour of one o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

GRAY DEW, Secretary.

Office, 13 and 15 Fremont street, San Francisco, California.

EVERETTE'S MINING OFFICE.

Pioneer Mining Office of the Northwest Coast.

Having the largest permanent brick assay furnaces, chemical laboratory and mining office on the Northwest Coast, with a collection of about 4000 samples of the ores of Alaska, British Columbia, Oregon and the Northwest Territories; and having made personal examinations of nearly every mining camp on the Pacific Slope, from California to Alaska, I am prepared to do any class of legitimate and honest mining work, such as EXAMINING, ENGINEERING, SAMPLING AND REPORTING ON THE VALUE OF ALL MINERAL, COAL AND FIRE-CLAY PROPERTIES, BUILDING STONES, EARTHS, ASSAYS AND ANALYSIS OF ORES, WATERS, CHECK, SAMPLES OF ORE, PULPS, "ORGANIC ANALYSIS" WORK, and in fact any work connected with the office of a first-class mining geologist and chemist. Any information mining men may desire to know relative to the MINERAL OR COAL RESOURCES of the entire Pacific Northwest will be honestly given. Address **Dr. Willis E. Everette**, Consulting Mining Geologist and Chemist, 1318 E Street, Tacoma, Wash.

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PATENT
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220 MARKET. ST. S.F.
ELEVATOR 12 FRONT. ST. S.F.

FRANCIS SMITH & CO.
Manufacturers of
Sheet Iron and Steel
PIPE!
ALL SIZES.
130 Beale Street, San Francisco, Cal

Iron cut, punched and formed, for making pipe on ground. All kinds of Tools supplied for making Pipe. Estimates given. Are prepared for coating all sizes of Pipe with a composition of Coal Tar and Asphaltum.

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The Evans School
OF
ASSAYING AND CHEMISTRY,
Rooms 46 & 47, 2d Floor Montgomery Bl'k. 628 Montgomery St. San Francisco,
Also, Evening Classes, 7 to 10 o'clock.
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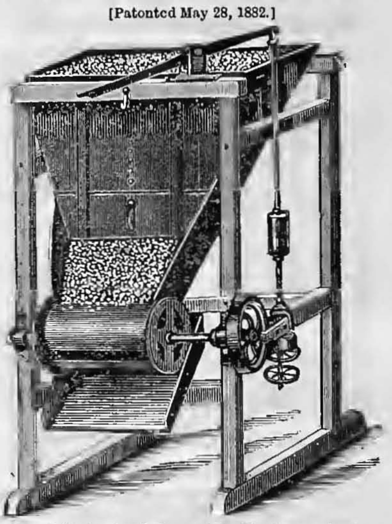

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Mining Affairs at West Point.

EDITORS PRESS:—I left San Francisco on the 20th of August and arrived at West Point, Calaveras Co., on the 22d, over a route new to me. I have lived in this city nearly 40 years, and have not had a great desire for traveling in the mountains. I had been troubled with neuralgia off and on for many years, and I was advised to take a trip to the mountains and "sweat" it out of me, which I think I have succeeded in doing. The fare from here to Valley Springs by rail is $4 55; then the stage to Mokelumne Hill, $1.50; then stage again to West Point, $2 50, and perhaps $2 50 on the road for meals. Arriving in the town, I stop at the new hotel, called the Mountain View, kept by a whole-souled old Californian named H. Beauchman. Everything is kept clean and neat; the rooms are clean and airy.

I went out about two miles from the town to see a friend of mine from San Francisco named C. W. Watkins, a very enterprising, stirring miner, with plenty of "get up and do" about him. I found him at a new mine that he has opened, or rather an old shaft that he sunk on. He has great faith in that camp. He went to work and made plans for machinery and hoisting works, and from the time he got the machinery on the road from here to West Point until he had it in operation hoisting, pumping water out of the mine and taking out good ore, was only about three weeks. The mine is called the Tucker, and it is about two miles southeast from West Point. He also at one time opened and operated the Blazing Star mine, the Water Lily, the Tom Paine and several other mines that are now taking out rich ores. If that camp had a few more such men as he is, it would be one of the best mining camps in the State of California.

I went all over West Point Mining District, and from information and what I have seen it seems that many of the failures in mining are due to the incompetency of men who went to West Point to make a fortune in mining without knowing much about it. Here, as in other camps, such men buy up a lot of machinery without knowing whether it will answer the purpose or not, and open the mine thinking they will strike a bonanza right off. They spend a few thousand dollars at guesswork, come to water in the mine (as in all mines with good ledges), their pumps are not good enough to keep the water out, expenses run up, men must be paid, no ore comes out of the mine, and it is shut down. After awhile the winter sets in and there is more water in the mine; the hoisting works get out of order, the houses go to rack, the machinery is useless in most cases, and they go to San Francisco and report the mines in West Point a failure and no good. Under such circumstances, the workingmen go to other camps to mine and give the camp a bad name, when in reality the cause is incompetency or lack of funds. There are numbers of such cases at West Point, which any man can see by going through the district. All men going to West Point to mine will find plenty of wood and water very low for mining. Lumber costs about $12 per thousand. In former days, say 25 or 30 years past, this was a rich camp, mostly peopled by Mexicans. They were good miners, but would not work in poor ground, as it would not pay them. They worked on the top of the ground and in many places sunk shafts from 20 to 100 feet, until they came to water. They would then quit work and go and sink another shaft, and repeat the same thing until the camp for miles around is nothing but mining holes. From all accounts, they got large amounts of rich ore from those shafts. They could not save any sulphurets, now considered the rich part of the ore. In some cases they would pack the ore for several miles on mule-back to have it crushed in some old arastra. If the rock did not pay them $50 to $300 or $400 to the ton they would not touch it, and would go elsewhere. Many of those old Mexican mining shafts are the rich mines that are now working. All that is wanted is some capital and a little energy and "get up and get" and some common sense to make a certain success at West Point.

Mining is like any other business and has to be attended to strictly by competent men, not by overseers sitting in barrooms playing cards and letting the mine take care of itself. In such cases you must and will meet failure.

After looking carefully into the causes of failure in mining in West Point, I am thoroughly satisfied from what I heard from others and saw for myself that mismanagement and want of funds form the real cause of dullness in this camp. There ought to be 20 mills working in that district at this time. In the southeast part of the district on the Mokelumne river is a different formation. About 4 or 5 miles from the town on the Slickings Fork, the ledges are very large, from 12 to 30 feet wide, though little work has been done there.

It is not very easy getting to it. Wood and water are free and plentiful. The ore is not, I think, as rich as the ore in the granite formation, and in this part of West Point it is in slate, which miners say will not give out as soon as those mines in granite.

Among those mines that are paying well is the Blazing Star. I saw an article in your paper yesterday stating that the men working in this mine had to lease it to get their pay. The ore shipped from there to the Selby works to be smelted is highly sulphureted and pays all the way from $50 to $500 and upward to the ton, but on the average it will pay $200. It costs at least $20 to $25 per ton to ship it here for working. The free milling ore is worked at the mine in a 3-stamp mill, which the miners say will pay or nearly pay the whole expense of running the works. If all that is true, which the men who take the ore out of the mine say they can prove, then by all means the miners should be paid their hard-earned wages without having to lease the mine.

But the miners say that in the last settlement they had with the managers they only received a fraction over 50 cents on the dollar for their hard work, many of them having families to support, and the storekeepers and hotel-keepers also suffer from this sort of management, which gives the camp a name it should not have. JAMES REILLY.

1827 Stockton St., San Francisco.

Calico Mining Items.

EDITORS PRESS:—The Waterloo Mining Co., Calico, San Bernardino county, is running their 60 stamp mill and their 15-stamp mill day and night, receiving 200 tons of ore per day from the Waterloo mine and 20 tons per day from the Silver King mine.

The Runover Mining Co. has 15 stamps at its mill kept running steadily on ore from the Occidental, Oriental No. 2, Silver Monument, Red Cloud and Mammoth mines.

The Barber Milling Co. start up on chloriders' ore shortly. A good run is expected, as chloriders have, as a rule, been doing well of late.

At the Young Waterman mine 40 tons of first-class ore are awaiting treatment.

From the Sue mine chloriders will ship 50 tons for treatment to Barber mill next week.

Pluth & Greer have about 100 tons of Champion ore ready for shipment, with prospects of a continuous body of ore. This is low-grade ore, but very easily mined.

John Sutton is taking out some very rich ore from the Golconda mine.

About 220 men are employed mining in this camp.

The Atwood mine, which has been idle for some time, has started up again under new management. L.

Silver.

London *Money* of recent date says: The Indian exchanges have moved steadily up with silver, and the Indian demand proves to have in no way decreased whenever a further rise in the metal seems impending. After awhile it is to be presumed that Indian trade will completely adapt itself to the new conditions. It is likely, too, that the Chinese demand will increase, and so possibly will that of Africa. So far as can be foreseen, then, a very considerable rise in the price of silver will not diminish the consumption. Of course it is possible that, on the other hand, it may largely increase the production. The production has been steadily increasing for many years, and it seems reasonable to conclude that a rise in price will further stimulate it. But it is to be borne in mind that of all industries mining is perhaps the most precarious. The gold production of the world was augmented enormously between 1850 and 1860, although gold was falling in value. During the past ten years it has been steadily decreasing, although the value of gold has been very greatly rising. Something of the same may happen in the case of silver. Some of the mines now believed to be very rich may suddenly give out, or all of them may prove to be less rich than they were supposed to be. Whether this will happen or not it is impossible to say. All that can be asserted with confidence is that the production does not depend on the value of the metal. We have in previous articles given our reasons for believing that sales by the Continental Governments will not be very large.

YIELD OF "WORKED OUT" MINES.—The Virginia *Enterprise* says that since James G. Fair's time as superintendent of the Cons. California and Virginia mine, when he thought it pretty well worked out, the mine has paid $3,466,800 in dividends, and probably $12,000,000 has been taken out. In the Hale and Norcross Superintendent Keating has taken out probably $5,000,000 and employed a large force of men extracting and working ore that Mr. Fair left, and there is plenty of it left yet. As Mr. Fair left plenty of ore in the Hale and Norcross and in the Con. Cal. and Virginia for Mr. Lyman and Mr. Keating to work at a profit, owing to improved methods and cheaper means of extraction and handling, so will Mr. Flood leave plenty for others to do likewise.

THE EFFECT OF GUM-CHEWING has been studied carefully by an expert. In gum-chewing the masseter muscles which move the jaw are abnormally developed, and the fatty substance which produces fair, plump cheeks is deteriorated.

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San Bernardino County.

Its Mineral and Other Resources.

NUMBER X.

[Written for the PRESS by JAMES H. CROSSMAN.]

Mining Districts.

San Bernardino county contains within its borders a number of mining districts, some of which since their formation have been subdivided. The names and boundaries of the subdivisions are given as accurately as possible.

On entering the county via Los Angeles on the S. P. R. R., the first that is called to our notice is the Temescal tin district, situated in the southwesterly portion of the Rancho Sobrante de San Jacinto. This district comprises Tp. 3 south, R. 5 west, and Tps. 3 south, R. 4 west.

Black Hawk District.

The initial point of this district commences at Rabbit Springs, thence 12 miles easterly to Old Woman's Springs, thence southerly to the east side of Cottonwood canyon, along the divide of the mountains to a high point easterly from Nichols' furnace in Morongo district; thence westerly to Arastra Creek valley, passing the old Morongo mines to the summit of the range, dividing Bear valley from Arastra valley, thence westerly six miles along said summit to the headwaters of Crystal creek; thence northerly to place of beginning, including Tp. 2 and a portion of 3 N. R., and 2 and 3 east S. B. M.

Holcomb Valley

District is bounded on the northeast by the Black Hawk mining district and the valley regions; on the west by the Gold and Silver district; on the south by the northerly base of Old Grayback, comprising that area situated in Tp. 3, N. R. and 1 and 2 E.

Bear Valley.

District is located on the southwest corner of Tp. 3 N., R. 1 east, and on the southeast corner of Tp. N., R. 1 W.

Burroughs District

Commences on its southwest corner at the mouth of Burroughs canyon where the Mojave river empties into the desert; thence up the Mojave river to the southwesterly line of the Holcomb Valley district; thence northerly to the desert; thence along and skirting the base of the mountain, following the outlines of the desert to the place of beginning, and, as will be seen by reference to the map published in the PRESS, includes the Gold and Silver district.

Ruby District

Lies in the form of a triangle, the northwest corner being the northeast corner of the Black Hawk district; thence due south 12 miles; thence east 12 miles to Gus Knight's Wells; thence northwesterly to place of beginning.

The Gold and Silver Mining District

Is included within the boundaries of the Burroughs district. Its boundaries are as follows: On the south and west by Deer creek, on the north by the desert, and on the east by Holcomb valley. This district has been set off and segregated from the Burroughs district since its formation.

The Morongo District

Is bounded on the northwest by the Black Hawk's southeast boundary line; thence due south for six miles; thence east to the Mojave desert; thence N. W. to the southeast boundary of Ruby District; thence west to place of beginning.

Silver Mountain District

Commences at Stoddart Crossing on the Mojave river; thence southeasterly to Rabbit Springs; thence southwesterly to the Panamint Crossing on the Mojave river; thence due west to county line of San Bernardino and Los Angeles; thence to S. E. corner of Kern; thence to place of beginning.

Ord District

Commences at the eastern boundary of Silver Mountain District; thence easterly to S. E. corner of Dry Lake District, 27 miles; thence north 18 miles; thence east 6 miles; thence due north 10 miles; thence following the Mojave river southwesterly for 6 miles; thence southerly to Newberry Station and to place of beginning.

The Lava Bed Mining District comprises Tp. 7 N., R. 4 E. and Tp. 7 N., R. 5 E.

Calico District

Comprises Tp. 10 N., R. 1 E., the south half of Tp. 11 N., R. 1 E. and west half of Tp. 10 N., R. 2 E; commencing at a point 2½ miles west of the Waterloo Mill or Little Red Butte; thence 10 miles south; thence 10 miles to place of beginning.

Grapevine District

Is bounded on the west by Dry lake; on the east by Calico Mining District; south by the Mojave river; north by the Mojave and Death Valley wagon-road; commencing at S.W. corner of Tp. 10 N, R. 2 W., and running along the west boundary of Calico District to Paradise Springs in Paradise valley, 10 miles distant; thence west 12 miles; thence south 10 miles; thence east 12 miles to place of beginning.

Solo District

Commences at a point on the northerly end of Cronise lake; thence southeasterly to Mesquite Springs; thence northeasterly to Marl Springs; thence northwesterly to Hallaron Springs; thence west to the northeast corner of Five Point District; thence southwesterly to place of beginning, commencing at N. E. corner Sec. 3, Tp. 12 N., Range 6 E; thence northeasterly to N. W. corner Tp. 14 N., Range 8 E.; thence easterly 21 miles; thence southeasterly to N. E. corner Tp. 12 N., Range 12 E.; thence S. W. to N. E. corner Tp. 11 N., R. 7 E.; thence northwesterly to place of beginning.

Alvord District

Has its northwesterly boundary at Garlic Springs; thence southerly for 24 miles to the southwest corner of Calico District; thence easterly 12 miles; thence northwesterly 20 miles to Bitter Springs; thence west to place of beginning.

Five Point District

Is bounded on the south by the Alvord Mining District; on the east by Solo Mining District; remaining boundaries unknown.

Clark District

Comprises that region inclosed between the following boundary: Commencing at S. W. corner Tp. 16 N., R. 12 East; thence N. 3 townships (18 miles); thence east to State line boundary; thence along State line boundary to N. E. corner Tp. 17 N., R. 15 E; thence south 2 townships; thence west 4 townships to place of beginning.

New York District

Commences at S. W. corner Tp. 11 N., Range 15 E.; thence north 24 miles; thence east 18 miles; thence south 24 miles; thence west 18 miles to place of beginning.

Brier District

Comprises an area of 24 square miles, situated in Salt Wells valley, Tp. 4 and 5 N., Range 7 and 8 W., S. B. M.

Borax Lake

Mining district comprises an area of 24 square miles, and is situated due east from Brier district.

Exchequer District

Commences at S. E. corner Tp. 10 N., Range 19 E.; thence north 10 miles; thence west 12 miles; thence south 18 miles; thence east 12 miles to place of beginning.

Trojan District,

Situated in Providence mountain, comprises that section lying within the following boundaries: Commencing at the N. W. corner Sec. 34, Tp. 9 N., Range 13 E; thence northerly from the initial point 18 miles; thence east 12 miles; thence south 18 miles; thence west 12 miles to place of beginning. Since the formation of this district it has been subdivided, and that portion west of the divide is known as the Gold Belt. The southeast half of the district has received the name of the Arrow gold district. The northeastern still retains the name of Trojan.

Sacramento District.

The initial point of its boundary line is the southeast corner of Exchequer district; thence east 12 miles; thence south 12 miles; thence west 12 miles; thence north to the place of beginning. Since its formation the boundaries have been extended in an easterly direction to the Colorado river, which now forms its easterly boundary.

Scanlon District

Is a new and important mining district recently formed. It is situated in Old Woman's Mountain and has the following boundaries: Its initial point is Danby Station, on the line of the A. & P. R. R.; thence northeasterly to Bolin Mountain; thence southeasterly to Old Woman's Peak; thence southwesterly to Coyote Springs; thence northerly to place of beginning.

Twenty-nine Palms

Comprises Tps. 1, 2 and 3 North, Ranges 1 and 2 E.; Tp. 3 N., Ranges 1, 2, 3 and 4; Tp. 2 N., Rs. 1, 2, 3 and 4.

Colorado River.

West of the range of mountains bordering this river there are several mining districts whose names are unknown to the writer; they are reported to contain large veins of gold-bearing quartz, copper and lead, with some very promising veins of silver-bearing ores. Their accessibility to the Colorado river, a navigable stream for steamboats, gives these claims additional value.

(*To be Continued.*)

ASTRONOMICAL SOCIETY.—The next regular meeting of the Astronomical Society of the Pacific will be held in the library of the Lick Observatory on Saturday, Sept. 13th. This will be the last meeting of the year at the Lick Observatory. The following papers are announced: Prof. L. Weinek, "Drawings of the Moon;" Prof. Milton Updergraft, "Some Notes on Astronomy in South America;" A. Lenschner, "Corrections to Oppolger's Bahnbestimmung;" R. Schmidt, "A Suggestion of a Way to Forward Our Knowledge of the Asteroids;" A. O. Lenschner, "Elements of Comet Coggia (July 19th);" A. O. Leuschner, "Elements of Comet Denning (July 23d);" Prof. Daniel Kirkwood, "The Age of Periodic Comets;" E. E. Barnard, "The Photographs of the Milky Way, Taken at the Lick Observatory in 1889."

SHUT DOWN.—H. M. Wheeler from Sanborn reports the mill shut down. It has been demonstrated that the ore must be roasted to be profitably worked, and the company will doubtless build a furnace. The employes of the company were all paid off, and it is not probable that the mill will be started again until a roasting furnace is built.—*Silver State.*

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San Bernardino County.

Its Mineral and Other Resources.

NUMBER XI.

[Written for the Press by James H. Crossman.]

Auriferous Gravel.

Lyth creek, 13 miles northwesterly from Colton, Sec. 27, Tp. 2 N., R. 6 W., has an average flow of 1300 miners' inches, of which 1000 inches is utilized by ranchmen for irrigation, and 300 inches for mining purposes. The fall of the creek for the first four miles is 200 feet to the mile; for the remaining distance the fall is 120 feet to the mile. On both sides of the creek the banks are lined with auriferous gravel, in many places 200 feet thick, which has been worked off and on for the past 30 years by both the hydraulic and the drift process. It is estimated that several hundred thousand dollars have been extracted from these mines. At date, however, the most available and accessible points have been exhausted and mining is now conducted in a weak, desultory manner, the want of water for hydraulicking being a serious drawback.

The Granite range is six miles long by three-fourths of a mile wide, coursing nearly northerly and southerly. On both the east and west banks, channels have been eroded—three channels in all. The west side shows a depth of gravel from 50 to 100 feet above its bed, much richer than its eastern companion. The richest pay is found on the rimrock between the old channels and the creek.

George Turk's placer claim is situated six miles from the mouth of the canyon (at an elevation of 3150 feet) on the east slope of the mountain near a spot known as Glenn's ranch, 18 miles north of San Bernardino. This mine was located in 1867, and has been worked irregularly ever since; the water is taken out two miles above the river, using 300 miners' inches. The gold is coarse nuggets, and its mint value is $19.10 per ounce. Good prospects can be found on the east slope of the hill 300 feet above the bedrock of the creek.

At Glenn's ranch, Tp. 2 N., R. 6 W., Sec. 22, S. B. M., a vein of gold-bearing quartz occurs which gives a good prospect in the horn spoon, but with no other work of development than a six-foot shaft. On the headwater of Lyth creek and its tributaries, numerous small gold-bearing veins occur on which but little development has been made. At Hot Springs, at an elevation of 2605 feet, a quartz vein crosses the traveled road on which an open cut has been made. The vein is from three to four feet in width, carrying both gold and silver assaying from $8 to $10 per ton.

Pliocene Gravel.

On the westerly slope of Antonio Peak, at an elevation of 8140 feet, a dead-river channel containing auriferous gravel was discovered in the summer of 1882 by Messrs. Ames and Henderson. The channel bed is filled with auriferous gravel, dissimilar in every essential particular to the alluvium that fills modern rivers. Judging from developments in the bed of this ancient river channel, it flowed from the north, bisecting the range at this point. The lowest point of the channel on the southerly side of the mountain shows an elevation of 8140 feet above tide-water. From this point southerly to the ocean, 48 miles distant, the grade is precipitous. In the first 15 miles the fall is 512 feet to the mile (the elevation being 457 feet). The remaining 33 miles to tide-water we find a fall of less than 14 feet to the mile. On the northerly flanks of the mountain range we find (estimating the level of the channel bed, not allowing for grade,) that we reach the Mojave desert in a descent of 5403 feet. The elevation at a point opposite is 2737 feet; distance, 18 miles on a horizontal line.

There has been a subsidence of large areas of land in the valley and desert regions lying both north and south of this range, as is generally acknowledged by writers and scientists. Previous to this event, in all probability the valley and its shore line extended southerly and westerly from 60 to 70 miles farther in this direction, at least as far as San Clementa and San Nicholas islands, to say nothing of the Channel islands, on which have been found remains of the mammoth mammal (vide Prof. Le Conte). Vast quantities of auriferous gravel are found on the southerly flanks of San Gabriel mountain, extending in places as far as the Pacific ocean. In many places the bluffs on the beaches are entirely composed of gravel resembling the bluff on each side of the mouth of the Klamath river.

This Antediluvian Water-Course

Is old, very old. It is aristocratic and high-toned, living way up in the snow-clad Sierras, but has seen better times and a warmer clime, judging from the fossil branches and trunks of trees that have recently been found in its bed. It was of mammoth proportions in keeping with the monster brutes that once roamed on its banks and laved in its waters, their remains still being found at lower elevations (vide Prof. Preston's, p. 202, Ninth Annual Report of our State Mineralogist).

But to return to our mutton. The gravel in the channel referred to resembles the Pliocene gravel-beds that are so extensively worked in the middle and northern counties of our State. The gold is of a peculiar shape and color. It is of a greater fineness (in excess of 900) than any gold found in modern rivers, unless derived from the class of channels referred to. The channel in question is being developed by three companies, each holding 1500 feet of frontage, extending back to the center of the divide. Both the hydraulic and drifting processes are used in developing these mines.

At the Head of San Gabriel Canyon,

Northwesterly from this point and at about the same elevation, the same character of gravel occurs, apparently an outbreak from the main lead. This class of gravel can be traced down the San Gabriel river to its mouth at a point southwest of Los Angeles for a distance of 30 miles. Below San Pedro, fronting the ocean, the gravelly bluffs of the shore line rise to a hight of 75 feet and extend for four miles.

The gravel-banks on the San Gabriel river are known to be rich, and several companies have been formed to work them, but for some reason unknown to the writer the projects have invariably fallen through and no active work commenced.

The Bald Mountain

Gold mines are in successful operation. The width of the channel-bed has been proved by crosscuts, and found to be from 200 to 250 feet at its lowest point in the center, with gradually-raising rims on either side. That portion of the channel that is being hydraulicked is from 30 to 200 feet in hight. The present workings are on the westerly rim of the channel. The course of the channel is northwest and southeast.

Water is obtained from the melting of snow, which is caught in storage reservoirs of small dimensions, and used under a 300-foot pressure through a 6-inch pipe, with a 2½ and 3-inch nozzle. The seasons are necessarily short, commencing in May and ending in November. The gravel first passes over a grizzly; thence through three 16-foot boxes, 16 inches wide and 24 inches deep, set at a 16-inch grade to the box. Quicksilver is not used on the boxes or ground-sluices, but in the undercurrent. The boxes contain riffles, 2x4, set at a sharp angle, 1½ inches apart. The mine is only worked in the daytime, but the yield is reported to be $8 per day to the hand; only six men are employed.

Bear Valley

Mining District is located on the southwest corner of Tp. 3 N., R. 1 E., and in the southeast corner of Tp. 3 N., R. 1 W. Here large areas of gravel occur which have been worked in an irregular manner by Mexicans who have, it is reported, drifted out the most valuable and accessible portion of the rich gravel that lies on and near the bedrock, and extracted large sums of money. The upper stratum to the surface is abundantly rich providing water could be obtained to work by hydraulic process under a sufficient pressure head. In 1886 and 1887 a large portion of the basin was sold by Alexander Del Mar to an English company. A corporation was formed under the name and style of the Valley Gravel (limited). The work of development was inaugurated by driving a long drain tunnel with so little grade and so near the surface that it was found valueless. The bedrock gravels exhausted, and sufficient head could not be obtained to work them owing to their great elevation. The work, however, is still being prosecuted.

Ruby Mining District.

On the east end of the Bear Valley range of mountains, where Cook and Rattlesnake canyons intersect, a flat has been formed of about three square miles covered with auriferous gravel of an unknown depth. The center of the channel never has been reached, although shafts have been sunk to depths of from 60 to 100 feet. The gravel on the rising bedrock is extracted and dry-washed, there being no water in the vicinity. This flat has never been prospected by other than Mexicans. It is reported that by this slow process $8 per day to the hand is not uncommon. The gravel is reported to be abundantly rich if there was water on the ground. The district derives its name from the large number of small rubies and garnets that are found with the gravel, it not being uncommon to get two tablespoonfuls of these stones from a single pan of earth. They are too small, however, to be valuable as gems.

Holcomb Valley

Mining District is situated in Tp. 3 N., R. 1 E., at an altitude of 7500 feet. The district embraces both gold-bearing quartz veins and placer mines. Prior to the year 1873, these mines were principally worked by Mexicans using the arastra process. In 1873, Barney Carter made the discovery of heavy outcrops of a strong and well-defined vein of gold-bearing quartz, coursing N. 40, W. and S. 40 degrees E. The discovery was made on the southeast corner of the above-mentioned township. He made three locations—the Rainbow, Littlefield and Moonlight.

Other discoveries followed, and about one mile farther north, five other locations were made on croppings that occurred on the same line of strike. These last are respectively known as the Last Chance, Cynthia, Morrison, Gulch and Hub, all of which are held by the present owners under a United States Patent. In 1873, E. J. Baldwin, Samuel T. Curtis and others of San Francisco purchased a portion of the property and erected a 40-stamp mill on the Rainbow, and after incorporating the three first-named mines made a stock deal, floated the stock and made a run of the mill. The rock crushed is reported to have paid $10 per ton. Shortly after the mill burned down, work was suspended, and never has been resumed. United States Deputy Surveyor Wm. J. Reynolds, by whom these mines were surveyed for patent, in his official report to the U. S. Surveyor-General, says: "The gold-belt is about three miles wide, having a general northwest and southeast trend. The altitude by aneroid at the Rainbow was found to be 8000 feet, and at the Cynthia 7000 feet. The geological formation on the southwest side is of gneiss flanked by micaceous granite, and that on the northeast side by metamorphic slate, in turn flanked by a talcose schist; the latter rock by granite, with an overlying deposit of limestone. The thickness or strength of the vein is from 20 to 40 feet, with a northerly dip of 84 degrees. Its gangue, granular quartz, hanging-wall serpentine, and footwall metamorphic slate." Capt. Peter Mackle of San Francisco furnished the writer with the following description of the

Green Mine,

1500x600 feet patented, situated in Holcomb valley. It is developed by shaft 210 feet deep from bottom; a lateral drift has been driven 310 feet, vein from 1 to 5 feet in thickness. From end of lateral drift a winze has been sunk which exposed four feet of good ore in its bottom. An adit can be driven 700 feet below on the line of the croppings, giving 300 feet of additional backs. Grade of average ore $25 per ton; water in the vicinity sufficient for 40 stamps.

Three arastras have just been completed and are ready to start on the ore. Quartz from the mine has been shipped to Daggett and elsewhere for tests, which have given good results. Sawmills in the vicinity furnish lumber at $10 per M. The divide lying between Bear and Holcomb valleys is covered with a dense growth of pine suitable for lumber, which is being utilized by mills in the vicinity, finding a ready sale for their product in the valley towns.

(To be Continued.)

The Demand for Mines.

We believe, says the Eureka *Sentinel*, there is going to be a good demand for good silver mines in the near future. We have advices from New York and Boston which seem to point strongly that way. Eastern capitalists are tired of real estate and real estate booms. They are also tired of loaning on farm mortgages. Millions of New England money has been invested in Kansas and other agricultural States on real estate securities. On most of this money not a dollar of interest has been paid in three years. The Chicago grain market and the New York cotton and railroad exchanges are considered too risky by the general run of conservative investors. What other field, then, is left except mining? With prudence, mining may be as safely followed as any other line of business. It is the most fascinating pursuit in the world. It awakens hopes and possibilities not realized in any other industry under the sun. It is the most independent occupation on earth. A man with a good mine never has to drum for business. It is he who is drummed by the tradespeople for his business. Personally we would rather have a good mine than any number of ranches in any State in the Union. A mine is a clean-cut proposition that yields up the hard cash, without trouble with book accounts, time notes and slow collections. It is the business, over and above all others, that stimulates all other branches. The great wonder is that more men of ample means do not occupy themselves in this highest type of industry.

The chief reason why they do not grows out of the fact, doubtless, that they do not understand it. It is a big job and a long job to convert an Eastern capitalist into the belief that a silver mine is a good thing to have. The closing down of other avenues of profitable employment for their money will bring them around to the point of investigating for themselves sooner than anything else; and when once their attention is arrested they will not be long in putting in their money. This is the basis of our best hope for money with which to develop our long-neglected mineral resources. There are good mines and good prospects. A prospect is not a mine, but the prospect must always precede the mine. Good mines are scarce and hard to find. They are worth good money when found. Promising prospects are plentiful. Here is the place to draw the line. Too many mining operators palm off mere prospects on the unwary as established mines. This has been the vice of the mining business all through the West. It has disgusted and repelled capital. Honesty should be the rule in everything. It applies to mines and mining as to everything else in life. If you have only a prospect, say it is a prospect and sell it as a prospect and nothing more. Then no one will be deceived. The business of collecting capital for mining is a tedious undertaking and full of disappointments, but we believe it is going to get easier right along until we have renewed activity all though the mining regions of the West.

THE MOUNTAIN SPRINGS.—Though the greater part of the snow deposited in the mountains last winter has disappeared, we are still deriving full benefit from it. The water from the melting snow descended into the ground and into the fissures of the rocks, and is now feeding all the mountain springs. Instead of shrinking in volume or going dry, as usual in recent years, these springs continue in full and strong flow, and thus a good stage of water is maintained in all our creeks and rivers. It is thought that the renewal of life in the springs is such as will continue two or three years, even though we shall not in that time be again favored with another such mighty snowfall as that of last winter.—*Virginia Enterprise.*

The American Race.

We have none. We are one people only by law, language, industry and commerce. In all else we are wide apart. Race, color, religion, thought, habit and condition, oh, how wide apart! We are gathered from the ends of the earth and exhibit specimens of the highest and lowest degree in all.

But come back here in a thousand years and you shall find all this vanished into thin air. We shall be one race—the American race. All trace of these distinctions will have passed away. There will be only one blood, bone, flesh, color and form—the American people will be one great family.

In a thousand years the white blood will have worked down among the darkest and lowest, and the black, Chinese, Indian and other blood will have crossed and streaked the first families. They will all be one flesh and the distinctive features will have passed away.

What will that race be? White, without a doubt, from light blonde to dark brunette. But all will pass for white. The prevailing element, the wealth, education, mental force and mastery and the numbers of the whites will make them the type, the race; but all the rest will leave their mark, here weak, there strong, but seen more or less all round.

Shall we be a superior race? How shall we compare with Europe, with the English, French, or German? Will the pure or the mixed prove the superior? Will there be a white race anywhere that will loom up above us and look down upon us as we do now upon the Chinese? Who can tell? History gives us no guide, no solution of this question. Pure races yet stand at the head of civilization.

Among ourselves, blot out the white element, and we should step down from the front rank among the nations; England, Germany or France would soon regard us as an easy prey; and when the mixture is thorough, and we are one people with all this mixed blood, shall we still hold the first place or drop to a second or third, and look up to the purer blood of Europe as something away above us?

We would none of us wish to have it. We are proud and we shall always be proud to be called Americans. We would have the American race first in the world. We would all be willing to do something to make it so. What can we do?

We cannot avoid the mixture of our races. It is not possible. The proudest family in the land cannot do that. For a time, perhaps, in the end, never! Time will bring us all into one pool. Beauty, talent, wealth and erratic love will do that for us in despite of all our efforts to prevent. A thousand years is a long time.

There is probably not a man in England who could not trace his lineage to King Alfred, and also to the shepherd who kept his herd.

Again, then, the question recurs, what sort of a people shall we be in the year 3000? We are working out the problem now. We are fixing the factors. We are mixing the dough to make that bread, and settling whether it shall be white, brown or black, and what it shall be in all other respects.

If we are wise we shall be very sparing of inferior elements. We shall close our doors in the face of all who will tend to degrade us. If they come they will increase and leaven the whole lump, as we have seen. Is it not enough to make us resolve "that no more shall come to stay and live among us who will not tend to improve rather than deteriorate our general average"?

We should begin this work now. Begin with the lowest, the most objectionable, and let the work of exclusion go on till none can come among us who bring objectionable form, defect or disease.

There is no fear that our numbers will suffer by this process. Indeed it is certain that within two centuries the tide of population must set away from us, for the reason that we shall be too thick upon the ground.

God made mankind so prolific as to stand the wear of savage life in the woods, and still hold their own and increase a little all the time. When war, famine, pestilence and death by wild beasts are removed, almost entirely, as with us, we increase very fast. Some aver that we may double every 25 years, till want of space forbids.

Now let us make it 50 years, to be sure, and what remains? In 1990 we shall be 80,000,000; in 1950, 160,000,000; in 2000, 320,000,000. We shall still be less than 50 to a square mile, and may double again before the year 3000. But that will perhaps be all we can do.

Numbers are no longer an object with us, either for strength or progress; and the time is not distant when we must not only accept none from the outside, but must begin to prune those within, with a view to maintain the purity of our race and security for our peace, happiness, liberty, and our republican institutions.

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San Bernardino County.

Its Mineral and Other Resources.

NUMBER XII.

[Written for the Press by James H. Crossman.]

Ord Mining District.

This district, on Ord mountain, comprises within its boundary lines an area of 342 square miles of mineral territory, the larger portion of which is unprospected. The district, as well as the mountain in which it is situated, derives its name from General Ord, U. S. A., who in 1866 commanded a military post (during a period of Indian hostility) at Camp Cady, a station on the Mojave river. The tribe of Indians that roamed over and inhabited this desert region were the Piutes, who were at that time numerous and on the warpath.

A detachment of scouts detailed by General Ord to investigate the mountain where Indian signal fires were frequently seen, on their return reported the mountain to be an Indian stronghold, also that it contained numerous springs of running water, and that while traversing the northerly end of the range they noticed a long line of croppings of a strong vein whose comb could be traced for several miles. On examination the rock showed particles of gold and also copper stain. A subsequent examination of the locality determined its location to be on the westerly extremity of the mountain range in Tp. 7 N., R. 1 E., at an elevation of 4500 feet above the level of the sea, and at a distance of 7½ miles in an air-line southerly from Daggett on the Mojave river, now a station on the Atlantic & Pacific railroad. This mineral discovery of the scouts soon became known. Miners and prospectors flocked in. The Indians left for some other locality. A mineral district was soon after formed which was given the name of the commander of the post (Ord). Locations were made, but the mines, though abundantly rich in copper and gold, were too far from a base of supplies to prove remunerative.

The locators being men of limited means, their capital soon became exhausted, and but little was accomplished toward actual development. At a later date J. B. Osborne, the well-known mining operator of the desert regions, formed an association with H. L. Drew, a capitalist of San Bernardino, as a partner, and commenced purchasing the locations. They succeeded in absorbing all of the most prominent mines of the district, and patented a number of them.

They commenced a systematic work of development and at date have expended a figure in excess of $70,000 in opening the mines, building roads, etc. A graded road to Daggett measures on the contour line 14 miles, over which the ores of the mine can be transported for a figure less than $1.50 per ton.

The purchases and locations of Messrs. Drew & Osborne are as follows: The Brilliant, Tehachipi, Modesto, Josephine, Last Chance, Coupon, Central, Rio Vista, Painsville, Empress, Cliff, Bluff, Sweetwater, Posy, Sunflower, Aztec, Coldwater, Bluebell, Keystone, Climax, Point Conception, Atlantic, Sunset and Wide West. They have numerous springs of water and territory suitable for townsites and reduction works—in fact these gentlemen are virtually possessors of a principality of mineral wealth. Of the 24 enumerated mining locations, nine have been patented and all have more or

(yellow and peacock), metallic copper in scales and powder—all carrying more or less gold in combination. The average yield of the metallic copper which is found at a depth of 250 feet in the Rio Vista mine is significant, when we take into consideration that the stamp work of the celebrated Calumet & Hecla mine of Lake Superior yields only from 4 to 5 per cent of this metallic product.

Of the group, the Coupon is the most important copper mine, showing a width of vein stuff between its incasing walls of 100 feet, with concentrated ore in bands and streaks of varying widths from 8 to 30 feet, with stringers and spurs occurring forming feeders which fall into the vein at its greatest point of expansion. Average samples taken from several openings on the mine of varying widths from 8 to 20 feet, gave the following returns, as assayed by Thomas Price & Son, San Francisco:

	Silver and gold values.	Copper, %.
1 Coupon	$3 97	11.1-10
2— "	4 83	9.2-10
3— "	—	10 51
4—Rio Vista	7 34 metallic copper	11.85

The gangue of the Coupon mine is of a character that admits of concentration to a high percentage before going to the smelter. These ores carry their own flux, iron and silica, with an abundance of lime, in the form of spar, which forms the west wall of the Coupon vein. It reaches its greatest expansion at a point where the Tehachipi intersects the main ore channel. (See plan.)

Development.

All of the principal mines have been sufficiently developed by shafts, crosscuts, levels, drifts and quarries to denote their character as true fissure veins of unusual width, persistence in depth and longitudinal extent. The values of the ores have been repeatedly proved and tested by chemical analysis and working tests.

The main arterial lode coursing longitudinally with that portion of the range in which it occurs, has been bisected and eroded by a ravine to a depth of 800 feet below the outcrop of the southerly location. This affords facilities for extending an adit southerly from the northerly exposure of the vein in the Point Conception mine on and in the vein to the full extent of the claim in that direction, passing longitudinally through the rich chutes of ore found in the Point Conception, Tehachipi, Coupon, Rio Vista, and at a distance of 8500 feet from its mouth give a vertical hight of 700 feet in the center of the Painsville mine, allowing four inches of grade to the rod.

Another important site for an adit would be at a point on the east slope of the divide opposite the Josephine mine, where a crosscut through the country would intersect the vein at a distance of 150 feet; thence southerly on the line of the main ore channel. In either of these adits the ores could be moved by gravity from mine to reduction works, the adit serving as a conduit for the passage of the water of the mine to the work.

Geological Features.

Ord mountain, at its greatest elevation, reaches a hight of 6300 feet. Its strike is northwest and southeast, its axis granitic, its make-up a heterogeneous mass of a great variety of rock, with but little apparent order or system. On its northeasterly flank an extinct crater of considerable dimensions occurs that at no remote period poured forth immense quantities of molten lava, covering the face of the country for many miles in a northerly direction. Its northwesterly borders have been traversed longitudinally and transversely by a mammoth fissure. The ores of this mammoth vein contain copious development, exposing immense quantities of copper and gold bearing ores.

Gold.

The principal and most developed are the Atlantic, Sunset, Point Conception, Rio Vista and Painsville mines, which carry an average grade of ore sufficiently high in the precious metal to warrant their transportation, if necessary, to the Mojave river for reduction.

Samples were taken as averages from the above-named mines and assayed at Messrs. Thos. Price & Son's assay office in San Francisco, with the following results:

Name of mine.	Silver.	Gold.	Total.
Sunset	$1 70	$22 74	$24 44
Rio Vista	10	14 47	14 57
Point Conception	5 50	10 34	15 84
Painsville	20	22 74	22 94

Copper returns not given, though the ores contained an appreciable quantity of that metal.

Copper.

While the enumerated mining locations all carry the ores of copper and gold, the mines in the main arterial lode comprising the Modesto, Josephine, Last Chance, Coupon and Central, with their lateral branches and spurs, have greater values for their copper product than for the precious metal. They are essentially copper mines, though as a rule of medium grade. Their lineal extent, great width and immense reserves warrant the erection of an extensive reduction, concentration and smelting plant. These ores consist of oxides (black, red and gray), carbonates (blue and green), sulphides per, gold and silver. The chimneys of ore are of considerable longitudinal extent and of great width. The strike of the lode is N. 5 W. and S. 5 E. The greatest expansion takes place where the Tehachipi mine intersects the Coupon at an acute angle. The vein is traceable by croppings and float for the entire distance from the Empress on the south to the northerly boundaries of the Point Conception and the Josephine mines, where it dips and is covered by the alluvions of a deep ravine or wash, to reappear again on the opposite bank in the Modesto and Brilliant locations. The lineal extent of the main arterial lode is 19,600 feet; northwest branch, 6000 feet; parallel lode, 3000 feet; adjacent and auxiliary location, 10,500 feet, or 39,200 feet in all.

The numerous springs that break out from the mountain-side indicate an abundant supply of water for all practical purposes.

Iron

That the mineral wealth of Ord mountain is not confined exclusively to the cupriferous, auriferous and argentiferous veins is demonstrated by the recent discovery of immense veins carrying the most valuable of all of the ores of iron (magnetites and hematites).

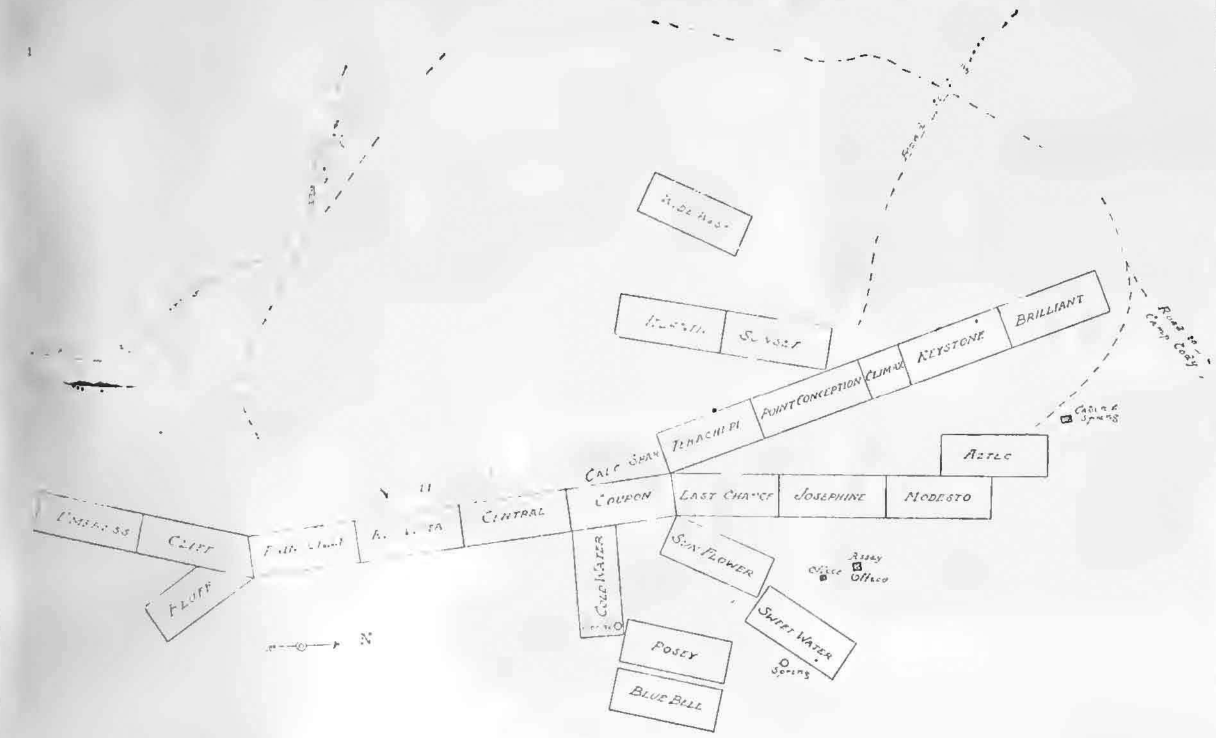
At a point on the westerly slope of the Ord mountain range, known as Iron mountain, 14 miles in a southeasterly direction from the Ord group of copper and gold-bearing mines previously described, and 18 miles southeasterly from Newberry station on the Atlantic & Pacific railroad over a road of easy grade, this important development occurs.

Eight miles distant from the mines in question the rocks show every evidence of the powerful effects of volcanic disturbance. Crossing the divide eight miles westerly from its summit, all evidence of subterranean heat and metamorphic action has disappeared, the axis of the range is granitic and the granite is in place and unchanged; at an elevation of 3350 feet (aneroid readings) we note the first evidence of the black, ponderous metallic product in chunks, and angular fragments strewn over the surface. We reach a vein of massive mineral that measures from wall to wall 30 feet. This location is known as Dick Turpin No. 1. We follow its course on a descending grade in a westerly direction, and the vein expands and increases in size until at the boundary line between Turpin Nos. 1 and 2 it has reached a width of 80 feet, gradually expanding until at the northerly extremity of No. 2 claim it attains a width of 400 feet. Two locations have also been made on a twin vein known as Tip Top No. 1 and No. 2. The ores are of a similar character, highly magnetic and remarkably free from sulphur or phosphorus; here the needle is inoperative—the polar star has no longer any attraction. In places on the Tip Top the ore changes to a soft gray iron ore known as "nut ore."

The iron vein cuts the mountain slope diagonally, disappears, and is covered by the debris of the desert plains. Another location in the vicinity is known as the Bessemer, showing a strong body of ore.

Four miles southeasterly from this point and on the same line of strike an extensive body of a similar character of ore occurs; it is from 20 to 100 feet in width. All that is required to make this immense body of iron available is railroad transportation, fuel and water. It lies on the borders of Rabbit Spring valley with a smooth and level road to Victor, a station on the line of the California Southern R. R., 36 miles distant in an air-line and about 42 in its contour. The gold and copper of the Ord group and the iron of Iron mountain will at no distant day warrant the construction of a railroad to these important properties.

(*To be Continued.*)



THE MINES OF ORD DISTRICT, SAN BERNARDINO COUNTY, CAL.

Eureka District, Nevada.

The Eureka *Sentinel* says: From the year 1864 up to the present time about 4500 mining locations were recorded in Eureka county, nearly 4000 of that number having been recorded in Eureka district. A large number of the latter were located during the most prosperous period of the camp, for speculative purposes only, that were never touched with a pick or shovel, but were abandoned. A large number of abandoned claims were several times relocated, and many bona fide claims were partly developed and consolidated or merged into companies. At no time were there ever more than 400 producing claims in the county, and at the close of last year less than 70 mines were producing ore. There are several reasons for this decline, principal among which were the low price of silver that was caused by its demonetization in 1873, high prices of fuel for the reduction of ore, high rates of transportation, discrimination of the Southern Pacific R. R. Company against us, and exorbitant charges and discounts made at our local reduction works which were the outcome of the other causes. There are a large number of claims in this district that formerly produced ore in abundance which have lain idle for years past. They did not pay to work under the circumstances above related; but all of the deterrent causes have been removed, and there remains no good reason why they should not now be reopened and become productive and profitable to their owners as well as beneficial to the camp.

The Low Adjustable Car.—Some time ago an account was published in the Mining and Scientific Press of the trial trip of the first one of these cars built, and the car was then pronounced a success. That car has been in regular service ever since on the Omnibus cable road in this city, giving great satisfaction, and the almost instantaneous transformation of this car from a beautiful open summer car to a perfectly closed or winter car may be seen daily when in use on the road. Two roads in Portland, one in Washington and one in Southern California are being stocked with the Low adjustable patent cars. Carter Bros. of Newark and the Stockton Car and Agricultural Works are prominent builders. Mr. Low states that the company has no agents except himself. No manufacturers have exclusive rights. Owners of roads paying royalty get the cars manufactured where they please at present.

The Union Mill Company of Tuscarora district, Nevada, has organized with the following directors: Thos. Bell, P. C. Hyman, Geo. W. Grayson, E Scott and F. A. Berlin. Thomas Bell has been appointed president, P. C. Hyman vice-president, R. R. Grayson secretary and H. W. Coffin superintendent of the mill. The Union mill is owned by the Commonwealth, North Belle Isle and Nevada Queen Mining Companies, each of which holds in its treasury one-third of the 100,000 shares of the capital stock of the mill company. On October 1st the mill, which is now being run by the Commonwealth Company for the owners, will be turned over to the new company, together with all supplies, etc. The rate for working ore has been established at $25 per ton.

Well Done.—In the U. S. Senate on Tuesday of this week, the House Anti Lottery bill was taken from the calendar and passed without a word of discussion.

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San Bernardino County.

Its Mineral and Other Resources.

NUMBER XIII.

[Written for the Press by James H. Crossman.]

Slover Mountain Marble and Lime.

Slover mountain is an isolated butte situated in Township 1 South, Range 5 West, San Bernardino meridian, three-quarters of a mile in a southwesterly direction from Colton. It is 977 feet above the level of the sea, and its greatest elevation is only 700 feet above the plain in which it occurs. Its dimensions from base to base are 3900 by 2600 feet, covering a superficial area of 10,146,000 square feet.

This mountain, though unimportant in dimensions, contains an immense storehouse of mineral wealth, and as a producer it can but add largely to the prosperity of San Bernardino county.

The mountain as an entirety is owned and operated by the California Marble and Building Stone Company, whose principal place of business is at Colton—V. P. Dyer, Esq., superintendent, with a branch or distributing office at 42 Flood Building, San Francisco—Jno. C. Pelton, Esq, manager. It is an incorporated company, capitalized in the sum of $500,000. The quarry is under the sole control and management of Superintendent Dyer, who has had 40 years' experience in some of the most notable marble quarries in both Europe and America.

Geology.

Geologically speaking, Slover mountain, though as a whole, to use a conventional phrase, composed of limestone, is composite in character, as its mineralogical make-up is dissimilar. The division lines between the different forms of calcareous stones are sharply drawn from north to south through its center, at right angles with its greatest longitudinal extent, which is easterly and westerly. The eastern portion contains both carbon and magnesia, the first forming a carbonate of lime (marble), and the second magnesian limestone, dolomite, aragonite or onyx. The westerly half is exceptionally a limestone of unusual purity, containing but five per cent of foreign matter when calcined and extraneous matter expelled by heat.

In this form it is a commercial product which is in demand from its remarkable purity and brilliant whiteness, commanding a good price in all portions of Southern California.

The stratification of the mountain is easterly and westerly, dipping southerly at an angle of 20 degrees.

The first product of the marble varieties is a carbonate of lime. It is of a fine crystallization (color both a pure white and of a pearly hue), suitable for structural or statuary purposes. The chisel gives clean-cut and sharp lines. The second (magnesian limestone), though a marble, is so peculiar in texture that it has not a counterpart in any of the known quarries of the world. It is crystalline in structure and homogeneous in character. Its crystals are semi-transparent, firmly held and cemented each to the other by a magnesian paste, forming a solid and impermeable mass. In color it varies from a jet black to a pearly white, from a gray to a brown, and also variegated red, yellow and green, the colors harmoniously blended. They occur in bands, veins and streaks. There is seen a mottled black and white, then an indescribable combination of colors, as if an artist had "pied" his palate into a common receptacle of fluid which had congealed without order or system. The lighter-colored marbles are semi-transparent (translucent), so much so that if cut into thin slabs any opaque substance held between it and the sun will cast a shade similar to fine porcelain.

This quarry, though in its infancy and its product but little known, is rapidly growing in reputation, and the stone is in demand both for structural and ornamental purposes.

The Marbles

Are susceptible of an unusually high polish. Their luster is so great that the observer would think that they were inclosed in and covered by a glass plate. Atmospheric influences, ink or citric acid do not affect them or change their color. Their intrinsic value is one-third greater than the imported Italian, and they can be laid down in the marts of the world at a far less price. The coloring matter of the stone consists of graphite and the oxides of other mineral products. Graphite exists in thin veins, but not in sufficient quantities to warrant its extraction as a commercial product.

The Marble-bearing Portion

Of Slover mountain is situated on its northeasterly borders, and to all appearances is inexhaustible. It lies in strata of considerable thickness. Developments as the work progresses constantly expose new and interesting varieties of stone. It is impossible to predict the future of this wonderful deposit.

Prof. A. W. Jackson of the University of California has made a number of analytical tests of the several varieties of the stone of this quarry, and reports that the greater portion of each variety which he tested should be classified as a carbonate of lime, as the amount of magnesia present was so small that it did not justify classifying it as a magnesian limestone, technically known as dolomite.

Developments.

The floor of the quarry which constitutes the main workings is situated 45 feet above the level on which the mill is situated. It is 500 feet in length by 30 feet high, and is rapidly increasing in hight as the work is extended. The hill has a slope of 28 degrees. During the writer's visit a block was quarried from the face of the works which measured 15x27x7 feet, and showed no flaws nor cracks.

Several small quarries have been opened at a greater elevation in order to test the extent, variety and quality of the marble. The highest point reached is 525 feet above the base.

Plant.

At the time of the writer's examination, the mill consisted of three gangs of saws of the capacity of 48,000 superficial feet per month. There is also one rubbing bed, one polishing machine, turning lathe, molding machine, slab machine driven by a 75 (high pressure) horse-power engine, with a supplemental 25-horse power engine to move the stone from the quarry to the mill. This mill has been so heavily taxed with an accumulation of orders from public and private buildings in San Francisco and elsewhere that I am informed it has been necessary to treble its capacity. Nine gangs of saws are now in operation, and preparations are being made for a much larger increase. Mr. Warren T. Kimball is now en route to Europe in order to ascertain the most desirable class of machinery for that purpose. The new additional plant will cost about $30,000.

There are about 1000 tons of marble ready at the quarry for shipment. On the writer's visit, a block of marble that had just been broken from the quarry measured 27 feet long by 15 feet wide by 7 feet in thickness, showing neither crack nor flaw.

The company is making preparations to ship to San Diego from five to ten carloads per day—each car to carry a solid block of 20 tons.

Both the Southern Pacific railroad and the Santa Fe system pass under the sheds of the quarry, affording unexceptionable transportation facilities for the product to all of the markets on the continent, both east and west. Fifty men are employed in quarry and mill, and the highest prices are paid for skilled labor.

Lime.

An extensive quarry has been opened on the southwesterly flanks of Slover mountain for the purpose of extracting this stone for its product, the lime of commerce. Its length is 100 feet and hight 600 feet.

The plant consists of four patent kilns with all the modern improvements. Two of them are respectively 33 and 45 feet in hight. The first produces 75 barrels and the latter 100 barrels commercial lime daily. Two are circular, 42 feet in hight, covered by iron sheds; capacity 45 barrels each, making an aggregate production of 265 barrels per day.

Eleven cords of wood are used daily. The company has erected at the works a barrel manufactory. The wood for this purpose is transported by water and team for a distance of 21 miles from the San Bernardino range of mountains. Lime is sold at the works at $1.20 per barrel, exclusive of the barrel, for which a further charge of 25 cents is made.

(To be Continued.)

The Gold Belt of California.

Ancient River Channels and Gravel Deposits.

NUMBER III.

[Written for the Mining and Scientific Press by Stephen Barton of Kernville, Cal.]

The discussion of the form of crystallization and the fineness of gold, as a prime subject of inquiry, would be aside from the purpose of these articles, and they are only referred to as auxiliary to the question as to where the gold came from. Though the gravel of the ancient, lava-capped hills is nearly all quartz, enough is discernible to enable us to determine that in many cases it came from lodes formed between slate walls. Greenstone, hornblende, slate and mica slate are associated with most of these deposits, but the levity of the latter generally leaves it on top. At Fairplay Hill, in the south part of El Dorado county, I have seen very heavy little chestnut-brown pebbles the size of beans, probably oxide of tin. These would be deep down in the fissures and were a sure criterion of a prospect of from 50 cents to $1 to the pan. A man might work all day, however, without getting more than five pans showing the pebbles. At this point there was more evidence of great force of current than any place I have seen in these ancient deposits.

First the current had concentrated in a groove in the bedrock sloping to the south; at the bottom of this groove it had struck a detached piece of granite some ten feet in diameter and had bored a round hole entirely through it some five feet in diameter. The polish on these water-worn surfaces was as hard as glass, notwithstanding that the mass could be broken into fragments and pounded into sand with the side of the pick. The hard polish seemed to be no thicker, however, than an egg shell. At this point, as well as at a point west of Columbia, Tuolumne county, I noticed heavy deposits of water-worn pebbles of lava. At the latter place a hill composed of this form of deposit rises more than 100 feet above the great stream of basaltic lava which forms Table mountain. I have said that it seems to me that there had been two periods of volcanic activity on the Pacific Coast, and I believe this basalt was erupted after the rivers had cut channels 200 feet deep among the lava-capped hills. Since basaltic columns are rather rare in California, I will digress enough to say that six-sided columns 100 feet high, standing perpendicular, may be seen overlooking the Stanislaus, three miles northwest of Columbia.

While on the subject of deposits of different ages, I will say that on the bluffs of the Tuolumne, below the mouth of the South Fork, there is a gravel deposit some 2000 feet above the bed of the adjacent stream, and not more than 300 feet below the grade of the oldest gravel deposits. This deposit corresponds with the grade of what is called Big Gap, in the dividing ridge between the Tuolumne and Merced. In following this grade and turning to the south for three miles we trace this ancient channel among the bluffs of the headwaters of the North Fork of the Merced. At La Grange on the Tuolumne, we are presented with a series of channels of different ages, one bench rising above another in regular terraces, so that the Tuolumne alone presents us a whole volume of past geological history, without a chapter missing, from the Miocene down to the very present.

I have often said to myself, what a fund of information Prof. Whitney could have given the mining world while paid to thread these deep solitudes, if he could only have brought his mind for a moiety of the time to abstain from dilating upon the wonders of the insect world. Bugology is all very good in its place, and doubtless there is money in it, but it is sadly out of place in a mining community. As it is, our most trustworthy information in regard to the mining region is obtained from men who made their observations with a roll of blankets and sack of flour on their backs.

I have spoken of a Pliocene deposit at the mouth of Kern river canyon and running thence to White river, along the edge of the Tulare valley. There are a few places where auriferous gravels have been worked beneath this cretaceous deposit, and I think it may yet develop mines of some value; but the depth of the chalk, the rapid dip of the bedrock beneath the valley and the great difficulty in obtaining a water supply prevent it from becoming the site of an extended industry.

We thus see that by beginning with the oldest forms of gravel deposit we are able to descend by one unbroken series of events to the present, with a retiring ocean constantly before us, and the channels of our rivers constantly growing deeper. This change was not limited to this side of the mountains. At the beginning of the era of ancient-gravel deposit, the evidence is that the Great Basin was an immense inland sea rising to the ancient beach above Salt Lake City; that this sea received the drainage of a vast region now outturning through the Columbia; and that a powerful stream descended through Owens River valley and reached the Colorado east of Mt. San Bernardino, leaving also a Miocene deposit west of that mountain several hundred feet above the sea.

There is no use of trying to theorize away from the facts. One stubborn fact is worth a thousand theories which are not known to have a foundation. I have mentioned the finding of a conch shell in the ancient gravels of Tuolumne. It was in the possession of a miner by the name of John Glase and was found by him near Columbia. I had forgotten that he also had the shell of a cardium or salt-water clam found there of apparently the same species now found on Long Island. This shell was, however, very much petrified and had endured the ravages of time too much for its species to be certainly and accurately determined. I had also forgotten to mention that while I was mining at Columbia, two skeletons, supposed to be human, were unearthed in the Stanahan tunnel in Table mountain, and that they were given in charge of the Geological Society of Sonora. To this I must add that John Huntley, Federal internal revenue collector after the war, found a number of shark's teeth in the chalk hills north of Kern river. Hence we see that in the ancient gravels there was a mingling of land and salt-water fossils. The sea was constantly surrendering to the land.

Back of the Miocene there seems to be a tremendous gap in the geological history of the western slope of the Sierra Nevada range. The only fossils I have met with in the older formations were at Mineral King, in Tulare county, and they were probably referable to the Silurian, or at latest not later than the Clinton sandstone. Still it has been claimed that the westernmost or main gold belt was of formations referable to the age of the Jura rocks. I have failed to see a single fossil from them.

(To be Continued)

Round Valley Coal Mines.—There is much excitement in Round Valley, Mendocino county, over the coal mines. The Bank of Nevada owns 100,000 acres of coal lands near the junction of the two forks of Eel river. They have let it lay for years untouched, but are now spending $15,000 in prospecting it. A tunnel was run into the bed where there were some croppings close to the Middle Fork. At first the bed lay at an incline of 45 degrees, but as the tunnel ran in the slant decreased to 20 degrees. The bed varies in thickness from 8 to 14 feet, and has improved in quality as the tunnel went down. At 140 feet, water stopped the work. Pumps have been sent for. In the meantime work is being prosecuted on another tunnel across the river. The coal is pronounced an excellent article for use on railroads and steamboats. Mr. Flood of the Nevada Bank states that the Fort Bragg R. R. Co. will build into Sherwood valley, where they will be met by the owners of the mines. It is the nearest outlet, and would greatly help the people of the Northern valleys. We sincerely hope it will prove to be more than an empty promise. The people of Round Valley are greatly elated over the prospects. Coal croppings are found along the range west of Round Valley for 20 or 30 miles to the north of the property of the Nevada Bank.—*Ukiah Press.*

Tin.

Tin Ore and What Appears Like It.

We republish, as follows, part of an article written for this journal some years ago by Melville Attwood, Esq., of this city, in view of the increasing interest in tin in this country:

In submitting to our readers this short notice on tin ore, it is perhaps desirable to make some preliminary remarks, and to state that our object is, if possible, to give the prospector searching for such ore a few plain directions, so as to enable him, without much trouble, to distinguish that ore from what appears like it, and also to point out the character of the rocks in which it is generally met with, and thereby save the prospector a needless expenditure of time and money in looking for that ore in places where it is not to be found.

Tin stone or ore occurs disseminated in the ancient rocks, particularly granite; also in beds and veins, in large irregular masses called *stockwerks*, and in pebbles, an assemblage of which is called stream works, where it occasionally takes a ligneous aspect and is termed wood tin. The late Dr. David Forbes, at a recent meeting of the London Geological Society, in 1881, said that he had received specimens of the granite from New South Wales tin region in the year 1859, and that he found them to be perfectly identical with the stanniferous granites of Cornwall, Spain, Bolivia, Peru and Malacca.

Tin ore, or cassiterite, occurs in considerable quantity in the sands of the river of Tipuani, in Bolivia, where, from its greater specific gravity, it accumulates in the washing apparatus (lavaderos) during the process for extracting the gold; this was particularly found to be the case at Playa Gritada, at the establishment of Don Ildefonso Villamil.

This cassiterite is generally in small semi-rounded nodules, frequently, however, showing one or more crystalline faces, and varying in size from a mustard seed to that of a hazel-nut. It is generally pure; that is, without attached rock substance; the color is mostly a dirty brownish-white or dark black, but fragments are occasionally met with of a fine wine-yellow color, or even colorless and transparent.

The stream or placer tin is always much purer, and consequently more valuable than that obtained directly from the mines. In Australia, the operations of the tin mines were at first restricted to the working of the beds and banks of existing water-courses and deposits near the surface, but now the beds of ancient streams 80 and 100 feet below the surface are found to contain rich deposits of tin ore, and the working of them does not differ much from that of the drifting works of our deep placers.

There are only two ores of tin, a peroxide or cassiterite, containing 78.62 tin and 21.38 oxygen, having a specific gravity varying from 6.3 to 7.1; hardness, 6.4 to 7. The color varies from white to pink, ruby-red, gray, grayish-black to black. The second variety, tin pyrites, containing 26.5 tin, 30.5 sulphur, 30 copper; specific gravity 4.3 to 4.5; hardness, 4; color, steel-gray to iron-black, often yellowish.

The following are a few ores and rocks that have been mistaken for tin: Titaniferous iron, magnetic iron, chromic iron, basaltic hornblende, silicate of iron, tungstate of iron, etc. Titaniferous iron has, however, only a specific gravity of from 4.5 to 5; hardness, 5 to 6; magnetic iron, 4.9 to 5.2; hardness, 5 5 to 6; chromic iron, 4 321; hardness, 5.5. The hornblende and silicate of iron have a specific gravity of about 4; tungstate of iron, specific gravity, 7.1 to 7 55; hardness, 5 to 5.5. The color of tin ore varies from white to pink, ruby-red, gray and black. It therefore is certainly no very reliable criterion for distinguishing tin ore. A safer characteristic is the weight or specific gravity. Unfortunately, tungstate of iron is nearly the same, or a little higher, but not so hard as tin, being only five. The color of the powdered ore forms a much better criterion than that of the unpowdered ore. The powder of good tin ore varies only from whitish-gray to dark drab, while tungstate of iron powders reddish brown, and titaniferous iron black. The value of stream tin ore, according to its freedom from gangue or dirt, varies from $200 to $300 per ton of ore.

The prospector may make a rude test of the suspected tin ore by pounding it up with some iron pyrites or magnetite and then washing it out with a batea; if tin, it will be heavier than either of those ores. Then use a little galena, and it will be found to be about the same weight.

Earthquakes are again frightening people in South Carolina. Six distinct shocks were felt at Charleston about daylight Tuesday morning. The last shock, accompanied by rumblings, lasted nearly a minute.

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San Bernardino County.

Its Mineral and Other Resources.

NUMBER XIV.

[Written for the Press by James H. Crossman.]

The Black Hawk Mining District.

This district is situated in a spur of the San Bernardino range of mountains of the same name as the district. Its trend is easterly and westerly, and it contains on its northerly flank an important belt of limestone, to which reference has been made in article three of this series. This belt cuts an important figure in the mineral resources of San Bernardino county. Adjoining its incasing rocks on either border, the limestone is dolomitic in character, containing on its southerly contact with a metamorphic granitic rock, veins of quartz and spar carrying the ores of lead, silver and copper, while on its northerly border gold and silver predominate.

This belt of lime is from four to six miles in width, extending and traceable at intervals from Bear valley to a point near the Colorado river. It contains in its make-up nearly all the varieties of limestone known to exist: Blue limestone suitable for manufacturing the lime of commerce, a carbonate of lime, pure crystalline and white, for structural or sculptural purposes; magnesian limestone, dolomite, known by the Latin races as the "metallic criador.' Its boundaries on the south are a granitic rock, and on the north a micaceous schist, underlaid by syenite and gneiss, but on both borders of the contact dolomitic rocks occur.

On the northerly border of this belt we find the series of mines known as the Black Hawk group, consisting of 21 locations, the most of which comprise an area of 1500 by 600 feet on the main mineral belt that here traverses the country.

The summit of Black Hawk mountain is 6720 feet above sea level. The bottom of the ore deposit on the Hecla is 5830 feet above sea level, and the top 5855 feet. The bottom of Tunnel No. 2 on the Lookout is 5250 feet, and of Tunnel No. 1, 5275 feet above sea level. The entrance to Black Hawk ravine from the desert is at an elevation of 4100 feet.

These mines are situated on the northerly flank of the range as it slopes toward the desert. The apex of the mountains at a point opposite the group in a southerly direction is 6700 feet high. Descending the mountain, we reach the Santa Fe and Lady Alice at an elevation of 6050 feet; at a lower elevation, and lying parallel, the Calumet and Hecla occur at 5855 feet. These four locations course with the stratification and dip into the mountain southerly at an angle of 35 degrees. They are well set in their incasing walls, showing no evidence of disturbance or displacement.

The remaining 17 have a reverse strike and lay conformably on a hard slenitic floor, dip southwesterly at a small angle of inclination as well as easterly and westerly from the ridge's center, varying in thickness from 10 to 60 feet. Strictly speaking, they form a blanket of gold-bearing quartz covered by from 10 to 40 feet of soil and debris. The quartz, to all appearance, has in places been by some powerful dynamic force pulverized, broken, disintegrated and crushed into a condition to be fed to the mill-hopper after passing over a grizzly to remove the coarser pieces. It contains bright particles of gold often visible to the eye, and is accompanied by some base which is not easily amalgamated. The ore here can be mined and milled at a very low figure. This deposit has been developed in a number of places by a system of open cuts in a quarry form, several tunnels having also been driven at right angles with the strike into the mass.

A Big Slide.

The observer would at first be puzzled to account for the origin of this singular formation, a blanket deposit gently sloping from the mountain toward a lower level. (This position of the vein would be reversed if it were in place undisturbed.) This mystery is solved if we ascend the precipitous mountain slope and examine the footwall of the Hecla and Calumet veins, which consists of a soft and easily decomposed variety of a calcareous schist, containing sufficient magnesia and talc when wet to slide and break away with the weight of the superincumbent mass. In point of fact it is a slide or slip of the face of the mountain on a mammoth scale. The movement was so slow that nothing has been displaced in the change of the lode from its former semi-vertical to its now nearly horizontal position. An estimate of the number of tons involved in this displacement would take a formidable array of figures. The quartz in the deposits has been estimated by good judges to carry gold values of from $2 to $25 per ton of 2000 pounds. Several drifts have been extended into the ore body for a distance of 180 feet, the face of which shows 20 feet of ore.

The outlook for the Black Hawk mines is particularly bright. A portion of this property (the Lookout and Buena Vista mines) has recently been sold to an English syndicate, who have since erected a 10-stamp mill upon them, the property being under the superintendence of Harry Del Mar. Wood for fuel and timber for mine purposes are abundant within a reasonable distance of the mines.

This company has brought in water through pipes from several springs in the vicinity, and is utilizing it for power as well as amalgamating purposes. It is claimed that there can be procured a sufficiency of water for a 100-stamp mill, the source of supply being at so great an elevation that any desired amount of pressure can be obtained.

Among the principal supplying springs, the Crystal is situated at an elevation of 6120 feet; the Arctic at 6450, and the Live Oak at 6700 feet above the level of the sea.

Reserves.

On the Santa Fe and Lady Alice, the most southerly mines of this group, the ore body has been exposed for a length of 800 feet by a width of 34 feet.

The Hecla, which joins the Santa Fe on the north, shows a large body of ore, some of it high grade.

Lady Alice and Calumet adjoining are but little worked. The Pinon claim shows a large body of ore, some of it being high grade.

The Lookout, adjoining the Pinon on the north, shows also a large body of ore (30 feet thick) 1000 feet long, much of it high grade. This mine has been opened by two tunnels 180 feet apart, and each 100 feet long; several open cuts having also been run, an upraise has been made through the ore to the surface.

The Senator mine joins the Lookout on the north, and shows a large body of ore opened by two short tunnels and open cut.

Black Hawk mine joins the Senator on the north, and shows a body of ore 600 feet long and from 10 to 60 feet thick, considerable of it high grade. It is opened by two tunnels 40 feet apart and several open cuts.

The Morongo King, Glasgow and Overly Scott.

Situated on the same vein and contiguous to each other, lie on the eastern slope of Black Hawk mountain, 18 miles easterly from the Cushingbury Ranche, at an elevation of 4500 feet above the level of the sea. The vein takes a curvilinear form, striking northwest to southwest. It lies between granite and a micaceous schist. On the Morongo King a shaft has been sunk to a depth of 180 feet, with lateral drifts of 30 feet. The ores are bunchy and spotted, but reported to carry gold values of $12 per ton. Eighty feet northerly from the first-mentioned vein, on the Overly Scott, a shaft of 14 feet deep has been put down. Antelope Springs, easterly ½ mile, would furnish enough water for mill purposes. There is wood for steam in the vicinity.

Preciado & Vader's Group of Mines

Are situated in Tp. 4 N., R. 6 E., 3 miles westerly from Old Woman's Springs. The locality is known as the Silver Reef. It lies in the same mineral belt and easterly from the Black Hawk group of mines. This district is but little known, nor are the lodes here much prospected, though quite numerous. Some of them show considerable strength, their ores carrying silver with traces of lead and copper. Several locations have been made by a Mexican company and a shaft has been sunk on the Hermosillo mine to a depth of 100 feet, from which there has been extracted about 100 tons of ore. This ore, graded to values of 84 ounces per ton, was hauled to Victor by wagons and thence sent by rail to San Francisco for reduction. Strike of vein, N. 40 E.; formation of incasing walls, lime (magnesia) and a porphyritic granite. But seven locations in all have been made here; the only developments of any account are on the Hermosillo and Santa Maria.

The Morongo Mining District

Lies on the southerly flank of the San Bernardino range of mountains. The formation here consists of metamorphic and porphyritic rock in which several large springs come to the surface. Scattered gold-bearing veins occur throughout the district, but are yet unimportant as producers, not having been developed to any extent.

The Rose Mine

Lies 14 miles southerly from Cushingbury, at an elevation of 7250 feet and near the head of Rattle Snake Canyon. The vein is heavily charged with iron in an oxidized form, and is said to carry gold values from $5 to $110 per ton. Its strike is north 20 west, and it is inclosed in walls of micaceous schist and talcose slate. It crops strongly for a distance of several thousand feet, and has been developed by a shaft to a depth of 100 feet. Two miles southeasterly from this mine there are a number of small veins from two to four inches thick, the ore from which has been worked by Mexicans in arastras, yielding over $100 per ton.

The Lawrence Mine,

A silver-lead bearing vein, situated in Rattle Snake Canyon, is four feet thick and developed by a 40-foot shaft and drift of same length. Its strike is north 40° east, dip southerly at an angle of 45°, vein inclosed in a formation of granite and micaceous slate.

The Morongo mine, 2000x600 feet, is situated in Pioni valley, 10 miles in a southeasterly direction from the Black Hawk mines, and six miles from Bear valley, in the Black Hawk mining district, and at an altitude of 6300 feet. The strike of the vein is N. 70 West, dip South 55 degrees. The footwall is composed of lime shale; hanging-wall, dolomite. The vein varies in strength from 10 to 40 feet and is reported to carry silver values of from $10 to $400 per ton. Capt. Peter Mackie, co owner with Messrs. Nichols & Childs of Los Angeles, reports that 300 tons of select ore were shipped to Colorado, Argo and Denver that returned $400 per ton, average value $45; the ore contains galena and silver, the latter in the form of a chloride with a small percentage of gold.

The mine has been developed by a series of shafts (nine in all) of varying depths, the deepest being 137 feet, where crosscuts show the vein between walls to be 40 feet thick.

The Yucupa mining district is situated 20 miles E. N. E. from Colton. In this district the Southern California Land and Stone Company have opened a promising quarry of sandstone and erected a mill on Mill creek. The stone here obtained consists of two varieties, the first and most valuable being a hard, fine-grained bluish rock, the second yellow and coarse, with less tensile strength. The rock splits and dresses well and can be quarried in blocks of any desired dimensions. This stone is known as the mentone and has acquired quite a reputation for structural and street-paving purposes. In the vicinity of this quarry a strong belt of limestone courses easterly and westerly, on which a quarry has been opened, kilns erected and commercial lime produced. The formation here, which has been highly metamorphosed, contains granite, porphyry and magnesian slates with metalliferous veins of quartz carrying the ores of both silver and gold. But little development work has, however, been done.

The Digleer

Granite quarry is situated on land owned by a colony of that name, 12 miles west of Colton and 4½ south of Cucamonga. Though this quarry has but recently been opened, we have good accounts as to the quality of the stone.

Clay.

A valuable body of clay exists in the vicinity of Colton, from which a first-quality of brick is burned.

(To be Continued.)

DIAMONDS IN AUSTRALIA.—It appears from a publication recently issued by the Government statisticians of New South Wales that many descriptions of gems and gem stones have been discovered in various parts of the Australasian colonies, but no systematic search has been made for any but the diamond. Diamonds are found in New South Wales, Victoria and Queensland, but only in the first named colony have any attempts been made to work the diamond drifts. The principal diamond-fields are situated at Bingera, near Inverell, in the New England district. The Government of New South Wales has on various occasions obtained the service of experts to report upon the fields, as well as the gems which have been from time to time extracted from them, and these reports, it is said, have generally been of an encouraging nature. The number of diamonds found in the colony to the end of 1887 is estimated at 75,000, the largest one being 5⅝ carats, or 16 2 grains. The diamonds occur in old territory river drifts, and in the more recent drifts derived from them. The deposits are extensive and have not yet been thoroughly prospected. The New South Wales diamonds are harder and much whiter than the South African diamonds, and are classified on a par with the best Brazilian gems. During the year 1887 the diamond companies at Cope's Creek, near Bingera, produced about 23,000 diamonds, weighing 5151 carats; but in 1888, owing to the severe drought which occurred, the search for diamonds had to be temporarily abandoned.—*Mining Review.*

NEW MEXICO ONYX.—Mrs. L. J. Caldwell of Chicago is the owner of ricolite and green onyx quarries being operated in Western Grant county, New Mexico. This is one of the most remarkable discoveries. The stone has the form of true fissure vein 50 feet wide and over a mile in length, and it is taken out in massive blocks and taken to Chicago, where it is becoming very popular for house decoration inside and outside. The stone is susceptible of a very high polish, and of a variety of colors—dark green and cream, striped and mottled, also pink and salmon. In fact, it carries what are termed the "lost colors" in stone. It is very tough, is superior to Mexican onyx, and is the only stone of the kind in the world that can be carved. Contracts have been signed to furnish to the new Alhambra theater and hotel and other public buildings in Chicago for decorative purposes. Mrs. Caldwell offers blocks of it to be used in the construction of the New Mexico exhibit pavilion at the World's Fair.—*Stone.*

TUNNELING UNDER THE NEW YORK NARROWS.—The long-talked-of scheme of tunneling under the Narrows in New York harbor has, it is announced, been seriously taken up by well-known capitalists, and it is quite possible that in the course of a few years we shall see railroad lines connecting the Great West with the eastern end of Long Island and ocean ferries to Great Britain. It is considered that the most desirable line for running a tunnel is one from somewhere near Fort Wadsworth, on the Staten Island shore, to Bay Ridge. The scheme, as far as known, contemplates the construction of two parallel tunnels at a depth of 35 feet below the bottom of the bay. The length is roughly put at one and three-quarter miles, and the cost, it is estimated, would not exceed $5,000,000, as it is considered that there will be no particular difficulty attendant upon the work of construction.

THE largest and highest electric-light tower in the world is to be erected in Minneapolis.

North Dakota Coal.

For the past five years the question of transmitting coal from the coal-beds of North Dakota down the Missouri river to Pierre has been under discussion, but owing to the general stagnation of business throughout the State since 1886, and the falling off of transportation on the river, the question for a time was lost sight of, but with the advent of the large river boat, the Abner O'Neal, or the Chaske as it was at first called, the people were again awakened to the necessity of taking hold of this matter of supplying this portion of South Dakota with cheaper fuel. The matter was arranged, and Mr. A. L. Silver, a practical coal man, was sent to North Dakota to investigate, and he was so favorably impressed with the outlook that he immediately purchased several hundred acres of these coal lands north of Bismarck and is now organizing a company, with a capital of $30,000, to begin active operations. The coal can be transported in barges with a capacity of 100 tons each or thereabout, and under the most liberal estimate it can be docked at Pierre for $2 per ton. It can be shipped to Chamberlain and other points below at about $2.50, and can even be shipped from here by rail and delivered in Huron at about the same figure. It can be readily seen that the retailer can make a handsome profit and sell this coal at less than one-half the present price of Iowa coal. The quality for soft coal is good, and will compare favorably with the soft coal shipped from the other States. A company of Iowa men have purchased 3000 acres of these lands and incorporated the North Dakota Coal Company, and in order to ascertain the heating power of this coal an analysis was procured from S. W. Johnson, Professor of Theoretical and Agricultural Chemistry of Yale College: Water, 14 88; volatile, 36 72; fixed carbon, 44.51; ash, 3 44; sulphur, 45.—*Yankton Herald.*

Railway Earnings.

The net earnings of the railroads in the United States amounted for the first seven months of the present year to $95 408,090, against $103 535,117 during a corresponding period in 1889. This falling off, the first that has occurred for many months, has been due mainly to heavy decreases by a few of the large systems, the general condition of net earnings being better than the figures indicate. The principal cause for the decrease is a large increase in operating expenses amounting to over $3,000,000. It is also to be remembered that the result of operations for the month is being compared with a very favorable month last year.

DAM FAILURES have been numerous. The dam at the outlet of Bonesteel Pond, 12 miles east of Troy, N. Y., gave way Sept. 18th, and the flood carried away buildings, dams and bridges for several miles. On the same date a dam near the head of Broad Brook, in the town of Ellington, Conn., gave way, and the flood swept down the valley for eight miles to the Connecticut river, carrying out five dams, two railway trestles and six highway bridges. The total loss is set at $50,000. Highway bridges have been carried away by floods in many parts of New York and New England.

THE high price and uncertainty of the supply of natural gas at Pittsburg have resulted in three large iron-mills going back to the use of coal for steam purposes. One mill at Alleghany has begun again the exclusive use of coal as a fuel. Natural-gas company managers believe the supply will soon be increased by new wells now under way, and point out that many industrial consumers of natural gas have used it extravagantly. The introduction of the meter system in connection with natural gas supplied to industrial establishments promises to induce more economy in its consumption.—*Bradstreet's.*

THE SEQUOIA PARK.—Secretary Noble has promulgated rules and regulations for the government of the park in Tulare county, containing the mammoth sequoias trees, created by Act of Congress and approved Sept. 25, 1890. The secretary christens it "The Sequoia National Park." The rules for its regulation are substantially the same as those covering the Yellowstone Park. The secretary said that if he found it practicable he would procure from a tract adjoining the park a section of one of the mammoth trees for exhibition at the World's Fair at Chicago.

THE Pittsburg *Dispatch* predicts that by the end of this year the Pittsburg district will be producing 1000 tons a day more pig iron than formerly, or an increase over last year of 33⅓ per cent. The present capacity is about 3000 tons per day, of which 700 tons is mill pig and the rest Bessemer. The present year will see more blast furnaces erected or nearing completion in that district than ever before. In all, seven new furnaces have been projected.

THE PHILADELPHIA CITY HALL.—The tower of the City Hall is now 335 feet high, yet on top of that 8000 tons of iron and bronze are to be placed. There is to be a clock-tower, the dials of which are to be 27 feet in diameter, surmounted by a statue of William Penn 37 feet high, and there will be numerous statues,

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Mad Mule and Other Mines.

EDITORS PRESS:—The so-called Mad Mule mine is situated about five miles north of Stella, and consists entirely of seam diggings. It was located some 20 years ago by Mr. Banghort, whose name for a long time it bore and who, working it for several years, made a fortune out of it. Finally, however, he gave it up, supposing it to be worked out. Other parties taking hold of it have since that time worked it with varying degrees of success. The present owners have been operating it for about a year and a half, and have pursued a course different from that followed by former owners, and in this course they have been successful from the start, the mine being now a fine-paying property. The gold taken out here is porous and light. There have been run in this ground some eight or ten miles of tunnels. The best-paying pan of quartz taken out here yielded about $1400 worth of gold.

The Iler Brothers from Sacramento, who have been mining in this vicinity the past two years, have struck rich ore in the White Rock ground, near Iron Mountain district. They have run a tunnel some 200 feet and found a fine body of ore, which shows well in free gold and sulphurets. There are two other ledges on this claim on one of which they had sunk a shaft some 75 feet. This shaft has been full of water all summer, but the tunnel since run has drained it entirely. These ledges undoubtedly come together about 200 feet from the end of tunnel. These boys expect to have a mill in operation on this claim some time next spring, going on and developing the lode meantime as fast as possible. J. D.

Shasta Co, Cal, Oct. 4, 1890.

Evading the Law.

EDITORS PRESS:—I wish to call your attention to the loose manner in which our mining laws are being carried out, the way in which claims are located and held, practically defeating the intent of these laws.

There is, for example, one man in this county who has more than 60 claims located, and I am confident that he does not do $60 worth of work per annum on the entire number. Now if we had a law requiring each locator to make oath to his assessment work with one or more witnesses, it would stop parties who run around and locate the whole country and do nothing. True, they cannot lawfully hold such claims, but few people care to try and rectify this abuse at the peril of having a lawsuit on their hands. Hence this unlawful practice is tolerated to the detriment of honest and legitimate mining. PROSPECTOR.

Shasta, Oct. 8, 1890.

A NEW TAMPING MATERIAL FOR BLASTING. Rossiter W. Raymond, in the New York *Engineering and Mining Journal*, has the following suggestion concerning the best material for tamping drill-holes, which ought to be of great interest to miners in the Kootenay Lake country. The variety of tamping materials employed in blasting is very large, and the subject has been discussed many times; but I do not remember having seen any mention of a material lately suggested to me by A. Mezger, a mining engineer of great experience and skill. I refer to jig tailings about one-quarter-inch in diameter of grains. Mr. Mezger says that this crushed and sized material works much better than sand, packing without any ramming, so as to make a good tamping even for black blasting powder. The application is very simple. Into holes inclining downward more than 40 degrees the tailings are charged with a funnel; for holes nearly level or inclined upward, they are filled in cartridges of one thickness of paper, which burst asunder when only slightly pressed with a tamper. The effect is always satisfactory; and as there is no pressure on the primer, this tamping material is especially to be recommended as diminishing danger in the use of nitro-glycerine and its compounds. Mines where concentration works are in operation can easily be provided with the material in abundance.

FOREIGN COIN VALUES.—A telegram received lately by Collector Phelps of the Customs Department from O. L. Spaulding, Assistant Secretary of the Treasury, is as follows: The department circular of the 1st of October proclaims values of foreign currencies as follows: Austrian florin, 42 cents; peso of Central American States, 85 cents; Shanghai tael, $1.25 6; Haikwan tael, $1 40; Mexican dollar, 92 3 cents; Russian rouble, 68 cents; Japanese yen, 91.7 cents, and other silver currencies in the same proportion. The circular will be forwarded as soon as printed.

SILVER-LEAD MINES WORKED BEFORE CHRIST.—Talk about the silver-lead mines of this country lacking permanency brings to notice the famous silver-lead mine of Laurium in Attica, Greece, that was being worked over 400 years before Christ, and was then probably several hundred years old. It has been worked more or less ever since, yet it is still being mined so successfully as to pay regular dividends.

The Gold Belt of California.

Ancient River Channels and Gravel Deposits.

NUMBER IV.

[Written for the MINING AND SCIENTIFIC PRESS by STEPHEN BARTON of Kernville, Cal.]

The system of "dead river" channels which has made the term "blue gravel" so famous in the northern part of the State is thus seen to have extended uninterruptedly through the counties of El Dorado, Amador, Calaveras, Tuolumne and Mariposa. There are also large deposits of ancient gravel in Fresno county, but these, like those mentioned in Kern county, may belong to a more recent system.

While there are no lava-capped gravel ridges on the western slope, in Tulare and Kern counties evidence is not wanting that this region had its ancient system of rivers. East of a creek put down on the Government charts as Lime creek, but usually called Dry creek, and which puts into the Kaweah river, in Tulare county, and in Tp. 14, S. of 27 E., at an altitude of about 4000 feet above the sea, large numbers of water-worn pebbles are found on the points of the ridges, and the granite bedrock is soft and highly oxidized, as if once the bed of a stream. The same conditions are met with at Wagy Flat, west of the forks of Kern river, in Kern county, at an altitude of 3500 feet above the sea and 1000 feet above the great mountain-locked valley of the South Fork.

As I have before indicated, these ancient channels appear to have debouched upon the points of the ridges at an altitude of 2000 feet above the sea. Only a portion of them have been thoroughly tested for gold. The spurs of the ridges, marking the terminal point of the great flow which came down beneath the Emigrant Ridge east of Placerville, have been worked under the names of Coon Hill, Cedar Hill, Spanish Hill, Negro Hill and White Rock; but these workings are like the skirmish line in front of an army before the line of battle has been drawn. The great reserve of those placers is in the Emigrant Ridge. For 15 miles a high rimrock on the north of this channel intervenes before reaching the bluffs of the South Fork of the American river, and drainage in that direction would be costly. To the south, the channel of Weber creek is too shallow to offer successful drainage for more than a short distance. Hence the workings are liable to progress inch by inch from the Hangtown Creek base. This channel had its source somewhere in the vicinity of Little Silver lake, some 30 miles east of Placerville, and crossed the present line of the South Fork near a point formerly known as Bartletts Ridge.

I do not claim that these ancient gravel deposits were equally rich in gold throughout their whole length. On the other hand, the local characteristics in crystallization, when the gold is of the same value, speak of the supply as having come from lateral sources; but for miles above Placerville this channel must increase in wealth as the source of supply is approached.

A channel in all respects similar to this puts down to the south of the Middle Fork of the Cosumnes. Though I mined here for three years, I never saw a miner who could tell whence this channel took its source, and at its terminal point I suppose it is scarcely prospected to-day, though the placers of that locality are known to have drawn their supply of gold from it.

Still another channel of this kind puts down in the south of El Dorado county, by Indian Diggings, but this I have never followed for any great distance.

Probably as much wealth lies buried in the channel which puts down to Volcano, in Amador county, as there is in the Emigrant Ridge; but here again my explorations have been cut short.

In the mining region of Calaveras county, the lava-capped hills are a marked feature of the landscape.

South of the North Fork of the Stanislaus, in Tuolumne county, there is a long stretch of cement covered channel, which, as I believe, remains without a single prospect-hole to-day. This channel must have crossed the present line of the Stanislaus somewhere in the direction of American Camp, and must have joined the flow from Murphys near Columbia.

The main Tuolumne river offers an instance of a stream adhering near to its original bed, notwithstanding a lava flow. The channel which passed to the Merced side of the ridge at Big Gap was evidently from the region now drained by the South and Middle Forks, and, as I have said, had no lava cap. But on the main river a flow of lava ran very nearly on the line of the present bed of the stream. West of Big Gap, it curved slightly to the south of the site of the modern channel, and there the lava cap may be seen for a distance of several miles. A rimrock separates this channel from the living river, and over this rimrock numerous springs are seen to rise from beneath the cement. At the point where this piece of a channel overlooks the Tuolumne, a tunnel was run into the pay gravel in 1869; but this gravel was so well cemented that it could not be washed, and the men threw up the claim in disgust, notwithstanding that they placed on exhibition at Oak Flat a piece of cement ten inches square, speckled over with gold on one side, like freckles on the human countenance. This gravel was of a dark blue, doubtless owing (as Mr. Talbott has well remarked) to the fact that the bedrock was of a serpentine slate.

For the present I will bid the auriferous gravels an adieu.

How to Avoid Strikes.

The extremely moderate and rational tone of the reply of Judge Dean, the president of the Cresson & Clearfield Coal and Coke Company, to the miners, dealing with the demands made by them upon the mine operators of District No. 2, embracing the Clearfield and Mountain regions, leads us to hope that a serious strike, affecting about 25,000 men, will be avoided. The whole style of this masterly address is a model for any employers of labor to adopt in dealing with a body of men who are possessed of common sense and capable of appreciating reason and fairness. In the preamble Judge Dean points out that the proposed scale of prices for mining agreed on by the miners of the district in convention makes demands which, if enforced at present selling prices of coal, would close the mines of the company he represents, and, in his belief, every mine in the district. He further gives the men credit for having in all probability acted without a knowledge of the facts as they exist on the side of the operators, and believes that if there had been a full consultation between fair, candid and intelligent men, operators and miners, prior to holding the convention, the action of the miners would have been different. This frank concession to the men on the part of the company of the right to make demands, and the appeal to them as fair, candid and intelligent men, was certainly the best way to insure fair consideration of the arguments of the mine operators. Then comes the plain *argumentum ad hominem* in the following words, which could certainly be understood by those interested:

"It seems to me our interests are so identified that it would be advantageous to us both to at least try to ascertain the facts on each side before taking such important steps affecting so seriously so many persons and such large investments of capital. We have invested over a million dollars in money; you have here the labor of more than 500 persons. We want to sell coal at a reasonable profit; you want to mine it at fair wages. If we do not pay fair wages you cannot afford to work for us and our mines must 'shut down.' If you demand unreasonably high wages we cannot afford to go on; the mines must 'shut down.' Neither of us makes anything by the shut-down; our capital lies idle; our improvements go to rack; you are idle for a longer or shorter time; lose time in hunting another place or other employment, besides expense of moving, with probably no larger returns for your work at the new place than you were receiving here, because wherever you may go you will not get more than fair wages; no operator can afford to pay more; if he attempts it, bankruptcy and a 'shut-down' soon follow. What is fair wages depends not on what you would like to get, or what we would like to pay, but on what, in view of the condition of the market and the nature of the competition we have to meet, we can afford to pay."

The demands of the miners were 26 in number, and through these Judge Dean goes carefully in his reply, conceding the point asked in some cases where fairness supported it, offering to make other changes requested if the miners could bring forward well-founded objections to the present method, and, in the case of those that affected the price of coal, tendering an inspection of the books of the company to prove to the satisfaction of the men that an advance in coal was incompatible with a continuance of operations.

The whole case is clearly summed up in these words: "The proposed scale seems to me to be based on a mistaken belief that this company is making large profits in which the miner does not share. You are receiving substantially fair wages in view of the condition of the coal business; this company at the same time has not earned and is not earning a fair profit on its large invested capital; nor do I believe any other operator in the district is in any better condition.

"Your right to organize and in convention adopt a scale advantageous to you, is not questioned; but a scale to be a fair one or a practicable one, must be based on existing conditions, on facts, and not alone on the interest of those who adopt it. In a business such as ours, which cannot be carried on by the operator without the miner, or by the miner without the operator, there never can be steady prosperity for both unless there be reciprocal good-will, fairness and candor."

While it may happen that in many cases the employer of labor, against whom a strike is threatened, has not so good a case on which to rest in reasoning with his men, we cannot too earnestly commend the style of argument adopted by Judge Dean, and we believe that were the demands of employes always met with a similar cool, judicial and painstaking exposition of the situation, many disastrous strikes would be avoided.—*Engineering and Mining Journal.*

IT IS ESTIMATED that in England one man in 500 gets a college education, and in America one in every 200.

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San Bernardino County.

Its Mineral and Other Resources.

NUMBER XIV.

[Written for the PRESS by JAMES H. CROSSMAN.]

Granite Quarries.

Having completed our examination of that portion of San Bernardino county that lies south of the range and in a previous article briefly described, we turn northward and cross the San Bernardino range at an elevation of 4676 feet, through Cajon Pass. From the summit of this Pass the broad expanse of desert comes into view, but the elevation is not sufficient to enable us to note its distinctive features, hills and low mountain ranges obstructing the vision.

From the summit of Mount San Bernardino, at an elevation of 11,550 feet above the level of the sea, with the aid of a field-glass we obtain a view of that portion of the amphitheater enclosed on the arc of a circle whose chord from west to east measures 216 miles, its area 17,496 square miles. A radial line extended from the center of the chord due north would intersect the center of the arc on the boundary line between Inyo and San Bernardino counties. From our point of observation, 108 miles west, we reach the ocean a few miles north of Santa Monica in Los Angeles county. We turn our eyes to the Orient, and the San Bernardino range with its outlying spurs gradually loses its integrity and disappears altogether in the desert before reaching the Colorado river. Scanning the horizon from east to west beyond the exterior boundaries of the arc, Clark, Kingston and Telescope peaks are seen. Tehachipi mountain, as well as other ranges of lesser note, stands in bold relief against the horizon contracting the circle, and at a lesser radius Garlic, Pilot and Eagle peaks and Old Dad of the Providence range form prominent figures in the landscape. In the foreground a verdureless plain, basin-shaped depressures, beds of dried lakes and short uninterrupted ranges without order or system, meet the eye in striking contrast with the green fields and cultivated farms lying off to the south and west. Viewing the country in that and the opposite direction, the change has been magical. The lines are sharply drawn by the crest of the mountain—on the south fertility, on the north sterility. We are apparently on a foreign soil. We reach Hesperia, a boom town, situated on the northerly flank of the range, with her unfinished buildings which were erected during the flush times, when corner lots in paper towns sold by the front foot. This townsite is covered by a forest of cactus. The Yucca plant attains here a hight of from five to eight feet. The short, stubby arms extending from its trunk are armed with bayonet-shaped leaves, terminating in a hard, flinty barb so sharp that it readily pierces man or beast if they come in contact with it. These monstrosities of the vegetable kingdom stand apart, each by itself, presenting in their isolation the appearance of a planted orchard. In the vicinity, however, and on the same tract of land, a redeeming feature meets the eye like an oasis on the desert. The cacti have here been conquered and give place to a cultivated field of 100 acres or more, on which the vine and various semi-tropical fruits have been cultivated with success. Here the vine comes to full maturity in three years or less, bearing evidence of the wonderful fertility of this soil wherever water can be obtained for irrigating purposes. Water from the Mojave river has been brought in here through a ditch 11 miles long.

Silver Mountain Mining District.

Having descended into the valley proper, we cross over into the low mountain range known as Victor, described in another article of this series. This mountain presents a seemingly impenetrable granitic wall to further progress in that direction. On a closer inspection, however, a narrow gorge is seen on its easterly slope. Here at an elevation of 50 feet above its base, an excavation of considerable extent appears in the rocky cliff, this being the result of man's handiwork. Presently a sharp report is heard and a black column of smoke ascending from the spot tells the tale that a blast has been fired, and a huge mass of the rock has been torn from its bed and sent to topple over, workmen appearing presently from sheltered nooks to ascertain the effect of the shot. This is the site of

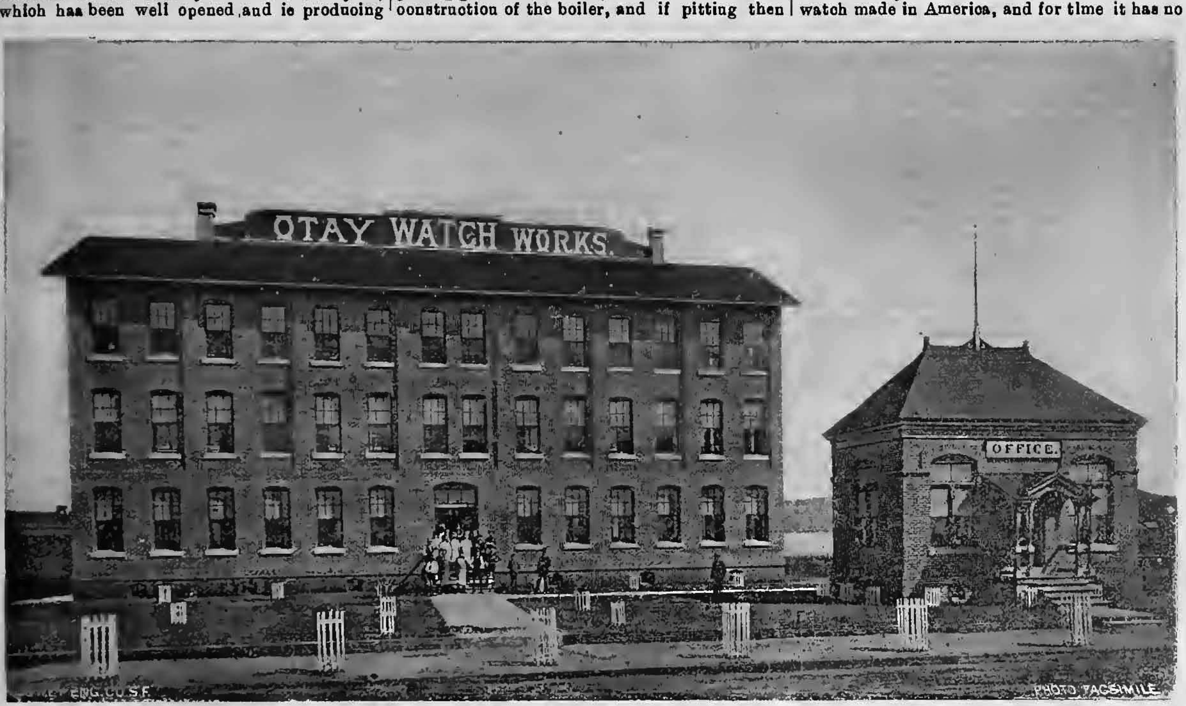
The St. John's Granite Quarry,

Situated in the Victor district at an elevation of 2763 feet above the level of the sea. This property is owned and operated by the Hesperia Land & Water Company of Los Angeles, who have opened quarries on both the east and west banks of the river. The western quarry presents exceptional facilities for both quarrying the rock and handling the stone, its face rising to a hight of 50 feet above the railroad track passing near it. The product of the mine can be moved by gravity and landed in the cars, but the stone is inferior to that taken out from the eastern quarry, where the principal work is at present being done. The formation is stratified, the strata being of considerable thickness and easily quarried. The deposit which pitches easterly at an angle of 14° has been opened up for a length of 700 feet by a depth of 60 feet, with 200 feet of vertical backs.

Upon visiting the quarry which is situated half a mile northerly from the town of Victor we found that the result of the shot witnessed was to detach from its bed a block of granite measuring 60 feet in length and four feet in width by 20 feet in thickness, and which after being dressed will contain 48,000 cubic feet. There is here very little waste, even the chips being utilized. This result was produced from a 15-foot hole, using a 2½-inch bit, loaded with Santa Cruz powder. The block was estimated by the superintendent, P. H. Leach, to have a value when dressed and ready for the market of $20,000. Another block lay on the floor of the quarry, which was being worked up into 4x4 size, its measurements being 9x13 feet. The color of the granite here is a bluish-gray, free from iron or other impurities likely to cause discoloration on exposure to the atmosphere. It splits straight with a clean fracture and dresses smoothly and is susceptible of a good polish.

In strength this stone is much above the average, competent judges having pronounced it fully equal in strength to the best Massachusetts blocks, which measuring 4x4 feet, are sold in Los Angeles for $1.25 per cut foot. Railroad and freight charges from quarry to Los Angeles by the carload of 20 tons are $20. This property has been worked steadily for the past three years by a regular force of about 25 men.

Thence northerly we follow the Mojave river for a distance of two and a half miles and reach the



THE OTAY WATCH FACTORY, OTAY, SAN DIEGO COUNTY.

Shearer Granite Quarry,

Situated on the easterly bank of the Mojave, which has been well opened and is producing stone of good quality. The face of the excavation is 50 feet in hight by 75 feet in length. The stone is reported to be similar to that extracted from its neighbor and in the same formation. This granitic belt is about 3 miles in length by one in width from north to south. On its northerly extremity a belt of limestone comes in, bisecting it at nearly a right angle. The stone is traceable for about 12 miles in the direction of Highland mountain, where it breaks up and becomes scattered, forming on its southerly flank a disconnected body of considerable dimensions in which a quarry has been opened, known as the

Los Angeles Granite Quarry.

It is owned by a party in Indiana, but no work is now being done upon it. The stone is much mixed and stained in streaks and spots. Some beautiful specimens of onyx have been quarried here and are now lying at the works. The plant here, consisting of shop buildings, etc., is ample for requirements. The product has been hauled by freight teams to Victor, 12 miles distant, for railroad transportation to a market.

(To be Continued.)

Decay of Boilers.

Many explosions of boilers would not have occurred if closer attention had been given to the deterioration of the boiler caused by the general or local decay of the material. A boiler when new may have a factor of safety of six; but it must be remembered that with the beginning of the life of a boiler, decay also begins, and that the original margin of safety is gradually reduced by the ever-progressing decay caused by corrosion; and if this decay is allowed to progress too far an explosion is sure to take place.

Corrosion does not always attack the surface of steel and iron plates in a uniform manner, hence the decay is more likely to be local than general. This difference in corrosion is probably due to the structural difference in the plates; they are not always perfectly homogeneous, being prevented from becoming so by the nature of the processes of manufacture.

For instance, the fibers of iron are welded together by squeezing, hammering and rolling, which sometimes allow the fibers to be separated by thin layers of impurities. The innumerable air and gas cells in steel ingots, more or less perfectly welded together by hammering and rolling, also prevent a perfect homogeneous structure; and it is fair to assume that the imperfect structure of the material is one of the causes of local corrosion; but in steam boilers there are other causes for local decay; for instance, a thin scale tends to protect the plates, but this scale often becomes detached in local places, leaving the clean iron exposed to corrosive action which rapidly progresses. Again, the fibers of the metal may have been loosened by bending, hammering, etc., all of which tend to accelerate corrosion.

Plates are affected in various ways by corrosion; frequently small cavities are formed in the plate, the depth varying from a shallow depression to an actual perforation of the plate. In some places the cavities lie far apart; in others they are close together, giving the plate a honeycombed appearance. This phenomenon is called pitting and may be caused by surface defects due to the intense local action of fatty acids, or other particles of corrosive substances; in some cases the cause of pitting is attributed to the galvanic action of particles of heterogeneous metals.

From the foregoing it appears that to prevent pitting good material only should enter into the construction of the boiler, and if pitting then occurs the water should then be analyzed, and, if necessary, changed; and greasy substances should not be allowed to enter into the boiler.

Frequently the corrosion forms deep furrows parallel and close to the seams; this phenomenon is called grooving or furrowing. In nearly every case this furrowing occurs under the water line, and in horizontal boilers with lap joints, the grooves are deepest along the horizontal seams. Probably the chief cause for furrowing is a chemical action, because it does not occur with all kinds of water, and it rarely occurs above the water line. But this chemical action is accelerated by a mechanical action which tends to change the form of the shell of the boiler, bending or springing the plates along the seams; but the bending of the plates may break off the incrustation, or even the outside scale of the plate itself, thus continuously exposing a fresh surface of the metal to the chemical action of the water.

The mechanical action may be due to the constantly occurring variation of the pressure, as steam is made or blown off, or it may be produced by the changes of temperature; and if this change of form goes on continually, though ever so slightly, along the same line, the mechanical action of itself must finally produce rupture.

Furrowing is often due to the carelessness of calking, by which the skin of the under plate is cut; careless workmen should not be permitted to use a calking tool.—*American Machinist.*

Our Journal in Arizona.—The Mining and Scientific Press is being accorded gratifying recognition by those in the mining interest in the progressive Territory of Arizona. Our agent, H. G. Parsons, sent us 60 new names as one feature of his work in the mining camps of Arizona, besides securing renewals. We believe our work will please our new friends at the South, and we invite them to co-operate with us in advancing the mining industries of that important region.

A Visit to the Otay Watch Factory.

Editors Press:—Leaving San Diego over the National City & Otay railroad, in a few minutes we reach National City (which I will describe in a future letter), and continuing, cross the rich valley of the Sweetwater. Here the N. C. & O. R. R. branches, one line going to the famous Sweetwater dam, the other to Tia Juana. Taking the Tia Juana line, we find ourselves a mile farther or ten miles from San Diego at Chula Vista. This in a few years will be one of the finest suburban towns in Southern California. Here are 5000 acres divided into 5-acre villa sites. The price of lots and cost of building as required by terms of sale preclude the possibility of an undesirable class settling here. The town is laid out on a beautiful stretch of land in full view of ocean and mountains, and is already well dotted with homes. Passing on three miles, we come to Otay, the home of the Otay Watch Co. By courtesy of Mr. P. H. Wheeler, the superintendent, I had the pleasure of seeing a California watch in all stages of its makeup from the crude material in the material-room to the finished watch ticking the tick of Otay. I give the following notes of the works, which, while brief, may be of interest to the Press readers:

The Otay Watch Works are situated in the flourishing young village of Otay, San Diego county, Cal. The works commenced building machinery a little over a year ago, and turned out their first watches May 17, 1890. The watch was a success from the very start, and it is truthfully said that it is the handsomest watch made in America, and for time it has no equal, thus speaking volumes for the great Pacific Coast. The watches may be found in all jewelry stores in California, Oregon, Washington and Nevada. Many have been shipped to Yokohama, Japan. The factory is on a very successful basis, at this time carrying a surplus to its credit each month. It is said beyond question that this has been the most successful start that has ever been made in America. The factory is three stories high, built of fine red brick, 100 feet long, 40 feet wide, with office, boiler and engine rooms separate. Fine green lawns are laid out in front of main building, covered by growing tropical vegetation of all kinds.

The experts came from Eastern factories at Elgin, Ill.; Springfield, Ill.; Columbus, Ohio; Waltham, Mass. The factory is under the supervision of P. H. Wheeler, the superintendent, who is the originator and designer of the Otay watch and the patentee inventor of all the inventions in use by this company. The factory is equipped with the finest kind of modern machinery, and the departments are run by skilled experts of the highest order and most successful in the watch business in the United States.

The company at present employs over 90 people, and is constantly adding to the number. To Frank A. Kimball, general manager, may be given much of the credit of establishing the company on a solid basis. In its early days before the first wheel turned, the company having underestimated the size of the undertaking, scarcely knew whether to continue or to retire. In this predicament Mr. Kimball, with the same enterprise that has ever distinguished him, came forward and personally set the company on the solid footing it now enjoys.

Otay, Cal. J. B. H.

It is reported that new veins of gold have been discovered in the vicinity of Wausau, Wis., where mining operations were first commenced.

The Late Dr. John Percy.

At the last anniversary of the London Geological Society, the president, W. T. Blanford, in noticing the recent deaths of members, spoke of Dr. Percy as follows:

John Percy was born at Nottingham on the 23d of April, 1817. He was the son of a solicitor, and after his early education studied medicine in Paris, where he appears to have derived his peculiar fondness for chemistry from the teachings of Gay-Lussac, Chevreul and Thenard. Subsequently he entered the University of Edinburgh and took the degree of M. D. in 1839, when only 21 years old. One of his fellow-students at Edinburgh was Edward Forbes, afterward, like Percy, one of the professors at the School of Mines.

His election to the Royal Society in 1846 was due to original experiments and researches in pathology, but meantime he was much engaged in metallurgical and chemical studies, and especially in investigations upon the properties of nickel and manganese. Some of his discoveries at this period were the foundation of metallurgical processes now in extensive use.

On the establishment of the Royal School of Mines in the Jermyn-Street Museum, 1851, Dr. Percy was elected as lecturer on metallurgy, a post which he held for 28 years.

His position, as by far the first metallurgical authority in the country, was now acknowledged on all sides, and the work to which, in addition to his lectures, he devoted the greater part of his time during the years that he held the professorship in Jermyn St., was the production of a great work on metallurgy in general. At the time when he undertook this, there was no comprehensive work on the subject in the English language. The value of the information may be inferred from the fact that translations of all the volumes as they appeared, were published both in French and German. Rarely in any country, probably never in England, was a more brilliant and gifted staff brought together for teaching purposes than those who, under the late Sir H. de la Beche, established a mining school in London, 1851.

Among the whole of them, as I can testify from memory, in the unanimous opinion of the students, Dr. Percy's lectures on metallurgy and Sir W. W. Smyth's on mining were preeminent for clearness, command of the subject and the power of conveying information from the master to the learner.

At present there is scarcely a scientific metallurgist or assayer who has made himself known in this country by his work, who has not passed through Percy's laboratory and learned science from his teaching.

For Postal Telegraphy.

Within the week, Postmaster-General Wanamaker has made public a letter which he lately addressed to the House Committee on Postoffices, in favor of his plan for a limited postal telegraph. He says, among other things:

"I am more than ever convinced of the wisdom and practicability of restoring the telegraph to the postal service and of making it what it was originally intended to be—part of the postal system. I say this after closely studying the arguments against the bill made so vigorously by the great telegraph company which is now its only visible opponent. There is a deep and far-reaching conviction among the people that the telegraph service is by right part of the postal service. The measure is to give the country a vast enlargement of the postal system and to bring home to the people the cheap use of one of the most powerful agencies of modern commerce and civilization. * *

"It has been argued by learned lawyers for a score of years that a Government telegraph is unconstitutional.... The courts of highest appeal have settled this question. Congress settled it in advance of judicial action by making the United States the owner and the Postoffice Department the manager of the first line of wire constructed for commercial and public use. The old Government telegraph schemes were constitutional. What shall be said, then, of the limited postal telegraph plan which I have been criticised for bringing forward? The Attorney-General for the Department has assured me that the conclusion that the scheme is constitutional cannot be resisted."

In concluding, the Postmaster-General says he has always invited the most rigid scrutiny and criticism of the measure. "It is not the proposition to take money from the treasury or employ additional civil servants; it is not a proposition to put any power whatever in the hands of the Government which is not at present greater and more dangerous where it is. It is the proposition simply to dovetail together two great machines so that one shall do business equitably and by that means make more money, which shall willingly be accorded to it by the people; the other to utilize its present skilled and faithful energy to help supply the people with still better means of communication, furnished still more cheaply.

"If others speak out for the telegraph stockholders, some one must stand out for the people in the interest of the cheaper telegraphy that they want. I believe it belongs to this Department to take this stand, and I propose intelligently and persistently to keep this subject before you, in the strong confidence that it will not be long before your committee will take steps to give the people the relief prayed for."

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San Bernardino County.

Its Mineral and Other Resources.

NUMBER XVI.

[Written for the PRESS by JAMES H. CROSSMAN.]

Highland Mountain District.

There occurs in this district an extensive gold-bearing lode traceable by workings and croppings in an easterly and westerly direction for a long distance. On this lode have been located three claims, known as the Gold Drop, the Side Winder and the Keyhole. Running near and parallel with this is another lode, the ore from which assays at the rate of $48 per ton.

The whole mountain slope northerly from the main vein seems mineralized for a distance of 300 feet, ore assaying in gold an average of $5 per ton. The vein in the main lode varies from 6 inches to 5½ feet in width, and will average 20 inches. The average assays of the ore on the 100-foot level of the Side Winder return $34 per ton. On this mine the principal development work has been done. Four shafts have been put down here. The main working shaft, No. 1, situated near the center of the claim, is 112½ feet deep, with sump 8 feet deep. No. 2, situated 448 feet farther west, has been sunk to a depth of 100 feet. At a point 232 feet westerly from this an adit has crosscut the formation for 30 feet to the vein, from which a level has been driven easterly 992 feet, intersecting shafts 1 and 2. This adit carries ore the whole distance, proving the ore chimney to be at least that long. From this adit a winze has been sunk between Nos. 1 and 2 to a depth of 50 feet, the bottom of which is in ore that assays $51.50 per ton. Between Nos. 1 and 2 the ground has been stoped to a hight of 10 feet; this, together with the ore extracted from the second shaft, yielded 750 tons. Two hundred and fifty feet westerly from the intersection of the adit level with the main vein, shaft No. 4 has been sunk to a depth of 55 feet, an adit having been commenced at a point 140 feet below the level referred to, which will afford 240 feet backs. A new 10-stamp mill, with all modern improvements, has been erected on the bank of the Mojave river, 13 miles distant from the mines, to which contracts have been made to haul ore for $2.50 per ton; back freight $1.50. This mine has been recently purchased by a gentleman from Colorado, who, being well acquainted with working this peculiar class of ore, is confident that he can work it up to 80 per cent of its assay value. Timber for mine purposes can be delivered at three cents per running foot.

This district contains within its boundaries 972 square miles, it being the largest in San Bernardino county. This extensive area is subdivided into "camps," which form centers of surrounding groups of mines known as follows: Victor, Highland Mountain, Oro Grande, North Central and West Camp.

Victor Camp

Is situated at an elevation of 2713 feet above the level of the sea, and being a railroad station it forms the receiving and distributing point for a large area of mining territory lying easterly from the Mojave river, as well as for several important mineral localities surrounding this district. The St. Johns and Shearer granite quarries previously described are in the immediate vicinity of the town, adding to its prosperity. The Harrison, containing the ores of zinc and lead in the form of a sulphide, lies northerly 4½ miles, inclosed in a belt of limestone. Adjoining, and near the line of contact of the granite, a shaft has been sunk to a depth of 18 feet. The ores, by assay, show 17 per cent lead, 35 per cent zinc and 27½ ounces silver per ton. Thence 10 miles easterly we reach the base of Highland mountain, which forms one of a series or cluster of isolated peaks composed of granite and feldspathic rocks traversed by dykes of trap, much stained and discolored by the oxides of iron, manganese and other metals, showing a high state of metamorphism. Bodies of calcite also occur, both magnesian and carboniferous. In these formations well-defined veins of quartz occur carrying the ores of gold, silver, lead and copper. On the northerly flank of the mountain, 12 miles easterly from Victor, at an elevation of 3800 feet, we find a gold-bearing vein known as the Side Winder. Its strike is easterly and westerly, inclosed in walls of decomposed porphyry and a soft talcose slate overlaid and underlaid by syenite. The vein is from 18 inches to 4 feet in width, stained and discolored by the oxides of iron and manganese, rendering the gold produced somewhat difficult to save by the free-milling process. Assay of ore yields from $20 to $50 per ton. A 10-stamp mill was erected at a point opposite the mine, on the Mojave river, for reducing the ores, but the results proving unsatisfactory and the process in use not adapted to the ores, the stamps were hung up and the mill is now idle.

A shaft has been sunk here to a depth of 150 feet with lateral drifts on the vein for 200 feet. The vein is traceable on its line of strike for a distance of 2000 feet. The easterly extension is known as the Gold Drop, with a 20-foot shaft with the same character of ore on the westerly extension called the Keyhole. Two shafts, respectively 26 and 10 feet in depth, show the same character of ores with about the same per ton value. There seems to be no good reason why the ores of these mines should not yield good returns with a proper system of concentration. About one mile distant on the southerly flank of the mountain a body of calcite occurs on which a quarry has been opened for the purpose of extracting its marble, which is reported to be of a superior quality. Contracts are being let for hauling the stone to Victor for railroad transportation to a market. Easterly, one-half a mile, we reach

The Greenback.

Elevation, 3725 feet, course N. 20 E; formation, lime shale and syenite gangue, calcspar vein four feet in width; ores, carbonates of copper and silver; thence southerly two miles,

The Imperial

Is reached. Strike of vein, N. 20 W.; dip, southwesterly 18°; gangue, quartz; lode, 7 to 10 feet in width; pay chute, 150 feet long; vein traceable 1000 feet, incasing walls talcose slate and syenite, carrying clay selvages, vein heavily mineralized with iron oxides, gold values (works) $9 per ton; but little development. The Homestake and Little Gold mine in the vicinity are both promising veins.

The Blue Jay

Is situated nine miles east of the Mojave river in the same range; formation syenite, with a lime cap, heavy croppings and copper stain; shaft 10 feet deep, crosscut 40 feet, exposing 15 feet ore vein much wider; ores, carbonate of copper carrying from 30 to 40 oz. silver per ton. Shipment to San Francisco gave a net result of $47 per ton. Thence easterly we reach a parallel range, no name, granitic axes with a belt of limestone on the westerly flank at and near the intersection of the two; formation, a well-defined vein carrying the ores of lead and silver, the former a sulphide galena, the latter a chloride; assay returns show 47 per cent lead and 22 oz. silver per ton. This is known as the Lead mine, development unimportant. These isolated ranges contain perennial springs of good water of sufficient flow for domestic purposes, but not in quantity for steam or reduction work. Oro Grande Camp, elevation 2625 feet, is situated on the bank of the Mojave river, is a station on the California Southern railway of the Sante Fe system. This camp also forms a trade center for an extensive mineral area. The mountain from which the camp or town derives its name is a storehouse of mineral wealth, containing well-defined veins carrying the ores of gold, silver, copper and lead. They are, however, of a rebellious character and either require chemical treatment or a smelting plant whereby the precious metals can be extracted by the assistance of a lead flux. Attempts have been made and a 10-stamp mill erected at Oro Grande for the purpose of treating the ores by the wet way, but without beneficial results. Oro Grande reduction works, erected at Oro Grande, could be run by water taken from the Mojave river. A ditch has been dug from a point 2½ miles distant, capacity, 1700 miners' inches, affording at its outlet a pressure head of 32½ feet.

Lime.

Several quarries have been opened in the vicinity of the camp, from which a superior quality of lime is manufactured. Four kilns for burning have been erected and two double kilns are in constant operation. Wyman's quarry, 250 feet long by 100 feet wide by 60 high, is a steady producer. There is a ready demand for the lime at the kilns at $1.50 per barrel. Ascending the mountain, which lies east of the town, at an elevation of 3750 feet, we reach the Oro Grande mine, strike N. 30 E., formation porphyry on hanging and trap on footwall, gangue quartz friable, and in place saccharoidal, well mineralized; strength 8 to 9 feet, ores silver and copper. At main shaft a large spur falls in from the west, causing an expansion of the ore body. Two shafts, inclining 65 degrees, have been sunk on footwall of lode; No. 1, 100 feet deep; No. 2 50 feet.

Blue Jacket, elevation 3300 feet, gangue calcareous quartz, strike N. E. and S. W; formation dolomite, strength of vein eight feet; shaft 10 feet deep, ores silver, copper and iron.

Eagle mine, 18-foot shaft, 4 feet wide; no walls on either side of shaft, vein much larger, croppings 10 feet. Assays of ore show 30 ounces silver and 17 per cent lead.

Oro Fino, elevation 3700 feet, strike E. and W.; formation feldspathic granite; dip 65 degrees S.; gangue quartz; strength from 6 to 20 inches, shows by horn-spoon tests $20 per ton.

Carbonate mine, formation blue limestone, stratified; gangue calcareous quartz, strength in croppings 2 feet at bottom of mine; vein 4 feet; assay value of ores at a point near the surface and assay returns show 40 per cent lead 57 ounces silver per ton; at the bottom of the mine, 140 ounces silver and 45 per cent lead, the latter principally carbonate, on which, at the writer's visit, a shaft had been sunk to a depth of 80 feet.

(To be Continued.)

THE San Francisco Bridge Company has been awarded contracts for the building of three bridges on the Canadian branch of the Great Northern over the Skagit, Stillaguamish and Snohomish rivers. The contracts are conditioned for the completion of the bridges by December 1st. They are to be truss structures, and the total cost will be nearly $150,000. The Snohomish bridge will be 1700 feet, the Stillagnamish 400 feet and the Skagit 600 feet long.

The Building of Cities.

A very interesting indication of the relative progress of different cities throughout the country is furnished by the totals of the building statistics. The totals of structures erected in 1889, with their cost in 15 of the leading cities, with some allowance for local conditions, are a very good measure for the growth and enterprise of the different communities.

In this showing Philadelphia maintains the lead, having put up 11,965 houses, while New York comes next with 6722. But in considering the cost of the buildings, New York is far ahead, having put $75,912,816 into new buildings, while Philadelphia's total of cost is but $26,000,000, and is exceeded by Boston as well as New York. These are the two cities whose new structures exceeded 5000. Following these are six cities where between 4000 and 5000 houses were built, and six more whose totals are between 2000 and 4000, in the following order:

	No. Houses.	Cost.	Average.
Chicago............	4,931	$25,065,500	$5,083
Brooklyn..........	4,500	25,619,405	5 706
Boston....	4,431	32,400,000	7,312
Minneapolis........	4,355	8,737,281	2,006
Washington........	4,048	6,165,715	1,523
Cleveland...	4,007	4,401,854	1 098
St. Paul...........	3,756	7,939,493	2,113
St Louis...........	3 544	9,765,700	2.765
Pittsburg..........	3,241	8 000,000	2,468
Denver...........	2,741	10 807,377	3,942
Omaha	2,498	4,663,735	1,803
Cincinnati....	2,104	4,143,214	1,969

In giving this comparison its proper value, it should be remembered that there are other things shown in it than the number of new buildings built. The total of cost shows the aggregate investment more clearly than the number of buildings, while the average cost of each building gives a better idea of the standard of architecture in each city than either of the other two. New York, while second in the number, is far ahead both in the total investment and in the average cost of buildings, which was $11,293. Philadelphia, while first in number and second in total cost, has an average for each building of but $2172, which gives it the eighth place on the list in that respect. Pittsburg has to take the eleventh place for number of houses, rises to the ninth for total investment, and its average cost of $2468 gives it the eighth place. While Cleveland is credited with 4007 houses against Pittsburg's 3241, her low average cost of $1098 brings the total investment down to $4,401 854, or a little more than half of Pittsburg's.—*Pittsburg Dispatch.*

IRON ORE OUTPUT AND FREIGHT.—The steady increase over last season in ore shipments is a surprise to both ore-shippers and vessel-owners, says the Cleveland (Ohio) *Marine Review.* Notwithstanding the delay at all ports, there is reason to believe that the total output of the Lake Superior mines will reach 9,000,000 tons, as the shipments up to the present time are in round numbers 6,000,000 tons, or about 900,000 tons in excess of the shipments at the corresponding time in 1889. It is a surprise to most ore-dealers that the movement should be so large in the face of disadvantages, but the ore is all sold, and a market might be found for more of it if it were to be had. The capacity of the mines has been reached, however, and enough vessels have been found to care for the output at moderate rates of freight. This active movement, with some demand for grain tonnage at Duluth, has helped the ore freight market, and there is a noticeable increase in the inquiry for boats at $1 from Ashland and Marquette, and 85 cents from Escanaba.

A COTTON PICKER.—Mr. A. Campbell of Chicago is the inventor of a cotton-picking machine which it is claimed will save 90 per cent of the present cost of picking. A company with a capital of $5,000,000 has been formed to manufacture it, and a factory to cost at least $50,000, and to employ 1000 men is contemplated. Each machine, it is estimated, will cost from $300 to $500, and it is claimed will do the work of 20 men. It consists of a two-wheeled cart, with a box receptacle to catch the picked cotton, and is drawn by mules. The motion of the cart sets in operation a system of fingers or pickers with mechanical appliances that do the work.

IT is stated that another great trunk line is to be built from New York to Chicago. It is to be known as the American Midland railroad, and is to begin at the terminus of the Central Railroad of New Jersey in Jersey City. It will run across New Jersey and traverse the anthracite coal region of Pennsylvania, and will then pass through the bituminous coal and oil sections of the Keystone State. It will cross and exchange business with 60 roads now in operation. The route selected is 120 miles shorter than the Pennsylvania and 200 miles shorter than the New York Central, and it will be the shortest between New York and Chicago.

PHILADELPHIA TO NEW YORK IN 36 MINUTES. Prof. Wm. D. Marks, engineer of the Edison Electric Light Company of Philadelphia, an electrical expert, says he is willing to stake his reputation as an electrical engineer on his ability to construct an electric motor that could take a train of cars from Philadelphia to New York in 36 minutes. One hundred and fifty miles an hour is the speed Prof. Marks' motor would have to make.—*Electrical Engineer.*

The Sequoia Forests of the Sierra Nevada—Their Location and Area.

[A paper read by FRANK J. WALKER at the California Academy of Sciences, Sept. 1, 1890.]

In the Standard Guide-Book to the Pacific Coast, of a late issue, we read this statement: "There are nine groves of big trees in California;" and in the descriptive sketch following this remarkable statement, we find three of the nine groves mentioned as lying south of King's river, vaguely described as: The King's River grove, the grove in the basin of North Tule, and the grove in the basin of South Tule. There are in the localities named, as containing three, no less than seven distinct groves and forests of big trees, while in the enumeration given there is no mention whatever by the author of the several groves and forests of Middle Tule, Kern or Kaweah rivers, nor of the most southern grove, on Deer creek; in short, the omissions comprise some 20 distinct Sequoia groves and forests, aggregating an area of at least 25,000 acres. Few, indeed, of the inhabitants of Tulare county, where most of the forests are found, have any conception of the wide extent of their Sequoia possessions; probably not one person in 500 knows of the existence even of big trees on the Kern-river slope, and many would dispute the fact—a fact I have never seen referred to in print—and yet there are no less than 2000 acres in that region, and some of it the most dense forest growth of *Sequoia gigantea* known to man. And so with other groves; many of them are to the general public practically unknown and unexplored.

The accompanying map is the first ever published with an approximate showing of the area, location or existence even of what is by far the larger part of our Sequoia possessions.

With reference to this map, it is my purpose in this paper to briefly mention what may be termed the forests of Sequoia, and the neighboring groves; and in making the distinction between forests and groves, it will be necessary to draw a somewhat arbitrary line; and for this purpose we will classify as forests all areas of 1000 acres or upward, and all below that as groves. According to this distinction, we can safely assume that all forests of *Sequoia gigantea* are to be found to the south of King's river, and nearly all of them in Tulare county; and with mere mention of the better known northern groves—the Calaveras, South Park, Tuolumne, Merced, Mariposa, Fresno and Washington—we will, therefore, confine our sketch to a description of this region only.

The first, going southward, and probably the largest compact body of all, is located on the south slope of the South Fork of King's river, in Fresno county. It is designated on your map as Converse Basin Forest. Its location may be given more exactly as in the northeastern portion of Township 13 South, Range 27 East, and the northwestern part of Township 13 South, Range 28 East, M. D. M., the larger part being in the latter township. [Please bear in mind that all townships and ranges hereafter given are south and east of Mount Diablo Meridian.] The area of this tract is about 5000 acres. These figures can at best be but an approximation. For most part, the Sequoia country is so broken, and the variation of density of growth so great, and the limits so vaguely defined, that an exact estimation is almost impossible; besides, it is likely to be misleading from the fact that it represents in some instances what might be called a heavy continuous growth, while in others it is more or less broken and scattering. In nearly all cases there is found mixed with the Sequoia a plentiful growth of other timber, principally yellow and sugar pine (*Pinus ponderosa* and *Pinus Lambertiana*), with a sprinkling here and there of fir, cedar and other growths. However, I have aimed everywhere to keep my estimates of areas well within bounds. This first forest, together with the one next in order, are owned by one of the leading lumber firms of California, and, next Wednesday, they celebrate at Sanger the completion of their 40-mile lumber flume, connecting their capacious mills in the mountains with the railroad on the plains. They propose to clean up everything as they go along, stripping the land bare and moving their mills and extending their flume from point to point as the timber supply becomes exhausted. It will probably take years for them to reach the Boulder Creek forest, in Township 13, Range 29, so named from the affluent of King's river, on whose slopes it is found. The area of this forest and neighboring groves cannot be less than 1500 acres, probably more. These two already mentioned lie altogether on the waters of King's river, in Fresno county, but the forest next to the south, the Fresno Big Tree forest, is on the divide between the waters of King's and Kaweah rivers, partly in Fresno and partly in Tulare counties. It lies in the contiguous corners of the four Townships 13 and 14, Ranges 27 and 28. Its original area cannot be computed at less than 2000 or 3000 acres, but so much of it has been stripped of its timber that its limits are hard to determine. Here have been the principal milling operations in Sequoia for the past 20 years. Four sections of it, containing what is known as the "Fresno Big Trees," have already been reserved by the United States Government, it being the only reservation ever made in these southern forests for the purpose of saving the Sequoia. This is the reservation recently confirmed by the Hon. Secretary of the Interior, and containing the famous big tree

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

Hydraulic Washing.

EDITORS PRESS:—In connection with my official work as United States Geologist, I have had frequent occasion to inspect the gold-bearing gravel deposits of this county and have been struck with the injustice done the mining community in not allowing these deposits to be worked by the hydraulic method. Except some valleys of limited extent, there is here no agricultural land that could be injured by the mining detritus for a distance of from 60 to 75 miles following the windings of the several forks of Feather river, and it is safe to say that only an infinitesimal amount of this material could get that far.

Moreover, the gravel deposits that lie at a considerable elevation, as in this county, are largely devoid of pipeclay and other fine sediment that could be transported far. In some cases trees are beginning to grow on the tailings, and this would unquestionably, in the course of time, effectually prevent further transportation of material either fine or coarse.

While fully recognizing the harm that has been done certain lands and the Sacramento river by the hydraulic washings in the foothills of the Sierra Nevada, I see no possible harm either to agriculture or to the navigation of the Sacramento and San Joaquin rivers that can come from mining by the hydraulic method in the higher parts of the Sierra Nevada.

It may not be generally known that the cultivation of the soil in valleys increases the amount of material washed away by rain water very markedly. The river Po in Italy is said to be now 70 feet above the valley in which it flows, the levees having been gradually built up to that hight as is now being done with the Sacramento levees.

This has been caused solely by the wear and tear of the natural forces, aided greatly by the stirring of the soil by plowing.

It is to be hoped that the time is not far distant when more discrimination will be observed in placing injunctions on hydraulic mines.

H. W. TURNER,
U. S. Geological Survey, San Francisco.
Plumas Co., Oct. 9, 1890

From the North Counties.

EDITORS PRESS:—Having during the past few months traveled extensively over this section of Northern California, affording ample opportunity to see much of the mines, I send you a few items relating thereto gathered during my journey.

Traveling down the Klamath river for more than a hundred miles, I found this had been a poor year for the hydraulic miners along that stream, owing to the great amount of damage done their works by the floods of last winter. Commencing at Richardson's Del Monte claim, two miles above Happy Camp, operations were here greatly retarded, owing to the destruction of a large portion of his capacious and costly ditch, much injury having been sustained by his sawmill and other property. This is one of the best properties on the river, but will turn out this year hardly more than one-half its usual complement of gold-dust.

Passing over a stretch of 40 miles along which much minor damage has been done, we arrive at the Heald mine, where again ditches and other portions of the plant have been much injured or wholly swept away. Skipping another considerable section of the river along which more or less harm has been caused by the high water, we come to the well-outfitted property of the English Company, above Orleans Bar, where large sections of costly ditch have been washed out, the sluice-boxes, undercurrents and other apparatus having been about all carried down stream. So complete has been the destruction here that the company has not as yet attempted to repair damages, nor is it quite certain when they will do so, though no doubt very soon, as this is a large and in all respects a first-class mining estate.

Below Orleans Bar, down to the mouth of the river, there is less hydraulic mining being done, nor is the plant here so much exposed to be injured by high water in the river or torrential floods descending from the mountains, these being the agencies most destructive to the ditches, built usually along the mountain-side and at a considerable elevation above the river. With the exception mentioned, most of the damage done by the heavy rains of last winter has now been repaired, and the hydraulic miners along the Klamath having now their claims in good shape, await the advent of the wet season to commence gravel-washing once more, the prospect for the coming season being unusually good.

As regards river-bed mining, of which a great deal is done along the Scott, Klamath and Salmon rivers, this season, owing to the postponement of the fall rains, is likely to prove an exceptionally good one, this class of miners having already, in many instances, gathered a rich harvest of gold.

Quartz mining throughout this whole northern section of California is also in a prosperous condition, many new claims having been opened and many new mills put up during the past year. As much of the ore here is of a friable character, the Huntington mill has come into large use in this portion of the State. As there occur, however, in all ledges hard bunches and streaks of ore, this material when present, as it always is to a greater or less extent, causes some trouble in the Huntington mill, as the springing rollers, when they come in contact with this hard substance, fly back, and as some time passes before they return to the grinding surface, a great deal of their force is lost. Owing to the above defect, this otherwise excellent mill has in several cases that have come to my knowledge been thrown out. There is said to have been some sort of a spring attachment invented which remedies this defect in the Huntington mill, the same, as I am told, having been patented through the agency of Dewey & Co. I have seen none of these appliances in use here. Could you give me some information about them, where they have been introduced, their cost, how they operate, etc.? As the PRESS circulates widely—we see in fact no other mining journal in this region—it might interest your readers generally, more especially the quartz millers, to know something about the above device.

While the Old Diggings and the French Gulch districts in Shasta, Deadwood, New River and East Fork in Trinity, and Humbug, Oro Fino and Salmon river in Siskiyou, constitute the more active quartz mining centers in these several counties, there are many other localities in each of them in which this industry is being well prospered.

You remarked in the PRESS, a week or two since, on the dearth of mining items, owing to the much interest being paid in the mountain districts to politics. Even so, for never did the miners, as a class, manifest greater interest in matters political than now. But for all this they are not strongly partisan. For this reason the Senatorial candidate in this district, R. H. Campbell, a long resident and an old-time miner, gets a strong support without much regard to party platforms or predilections.

THOMAS L BAILEY.
Scott River, Siskiyou Co., Cal., Oct. 22, '90.

Silver King, Pinal County, Arizona.

EDITORS PRESS:—In saying, as I did in my last letter to the PRESS, that nothing was going on here in the way of mining outside of the Silver King, of course I had reference to mining companies owning mining property here, not to work being done by prospectors and practical miners engaged out in the mountains, studying their rocky tablets, sizing up their metallic wealth, and sinking prospect-holes on different seams of ore to ascertain the best one and the best place in which to do their work, and thus induce the capitalist to assist them to follow into the mountains and open up the secret treasure vaults, and thereby improve the financial condition of himself, the investor and mankind generally.

The Silver King Co. is still sinking the Bilk shaft, which has attained a depth of about 1175 feet.

Since writing you last, the Silver King Co. has discovered ore. This find is made in a drift some 500 feet northeasterly from the Bilk shaft. This drift is in the 985-foot level, generally termed the 1000 foot level. This drift they have been quietly driving since last April. The Bilk dump is assuming the "old" King dump's ancient hue. But this King kindly colored metalliferous rock does not come from the bottom of the Bilk shaft; it comes from the above-mentioned drift, which, possibly, is approaching the western verge of the ore channel that produced this chimney of *virgin silver* called the Silver King mine.

Mr. John Phillips, superintendent of the Mineral King, has returned from San Francisco, where he went to purchase machinery for the Crispin mine. He also purchased a ten-ton smelter which will arrive in eight or ten days. He has quite a force of men working, preparing the ground on which to plant the smelter. When he is ready to blow in he will commence reducing the camp to bullion. The Silver Crown Co, which is also a San Francisco corporation, is doing the annual assessment on its Lauretta, formerly the Athens mine, which in the early history of this camp was famed for the metallic silver it produced. Several prospectors are booming the mountains now, doing assessment work. There are several prospects here which are promising enough, if developed, to become Silver Kings. Of their merits I shall in the future write.

CORRESPONDENT.

NICKEL ORE.—The chief of the Ordnance Bureau of the Navy Department is giving attention to the procurement of nickel ore or matte, for which Congress appropriated $1,000,000. A representative of the firms which deal in this ore and metal has been in communication with the department, and to ascertain the exact capacity of our domestic nickel works, several competent steel experts have been sent by the department to various parts of the country. Chief Folger of the Ordnance Bureau intends to ascertain the possibilities of the alloy of steel and nickel in other branches of naval construction, as well as in the manufacture of armor plate, in which it already has shown such creditable qualities that he is preparing to have made at Washington navy-yard a series of tests which will include proof trials of projectiles made from the new alloy, as well as the usual test of elasticity, strength, ductility, etc.

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San Bernardino County.

Its Mineral and Other Resources.

NUMBER XVII.

[Written for the PRESS by JAMES H. CROSSMAN.

Silver Mountain Mining District.

Going from the town of Oro Grande, elevation 2625 feet, in an easterly direction, we reach a low pass on the Oro Grande range, distance, 3½ miles. On our way we cross a belt of dolomitic limestone on which a few open cuts have been made to test the character of the stone as a marketable product. In a southeasterly direction, two miles distant, the range attains its greatest elevation, the culminating point here reaching a hight of 4525 feet, its craggy peaks standing out in bold relief against the horizon. To the east, a deep canyon terminates six miles distant on the desert plains. Northeasterly, and nearly on a level with our standpoint, a distinct and well-defined line of croppings of a pearly whiteness, changing to a yellowish hue, is seen on the face of an oval-shaped hill, and about midway from base to summit. These croppings lie horizontally, and course longitudinally with the range in which they are situated. Their color is in strong contrast with the overlying and underlying rocks. Approaching the mountain and examining its structure from its base to the croppings referred to, the formation is composed of a syenitic rock containing spots and stringers of an apple-green hue, technically known as "olvine." This formation constitutes the footwall of an extensive belt of clay, which contains all the elements and properties of the commercial product known as

Kaolin.

A bed of which crossing northerly and southerly can be traced at intervals by exposures a distance of 9000 feet. The hanging-wall or overlying formation is a feldspathic porphyry with the mineral feldspar predominating. Its origin and occurrence is easily accounted for. During a period of volcanic activity a fissure was undoubtedly opened on the easiest line of fracture, which proved to be on the contact of the two dissimilar formations, the crack or opening in the earth's crust permitting the evolution of chlorine and those powerful gases from deep-seated centers bleaching, disintegrating and decomposing the rocky structure through which it passed, chemically formed this kaolin, the best clay for the potter's use known to man. This clay is suitable for the manufacture of all of the finer classes of earthenware. Repeated tests of this product have been made by potters in England, France and the United States, all of whom have pronounced it a good article. Prof. Hilgard of the State University, and Prof. Chas. Schneider of the California State Mining Bureau, have analyzed this clay and class it as a kaolin of superior quality, suitable for the potter's use. Their analysis shows: Silica, alumina, iron, lime, magnesia, alkalines and water in the same proportions as found in the best imported product. The overlying porphyritic formation has also been tested and found to be suitable for the manufacture of the coarser classes of pottery as well as for firebrick, an article of which our yearly importations amount to a large sum. This kaolin varies in color from a pure white pulverulent substance resembling prepared chalk or magnesia to a yellowish-reddish tinge, the discoloration being caused by metallic oxides which can be easily eliminated. The pure white pulverulent product of the mine has been used by the Messrs. Bancroft of this city for the manufacture of crayon for artists' use. A lady residing at the Palace hotel in this city uses it in the manufacture of a face-powder, which meets with a ready sale to her lady acquaintances.

This vein or bed has been opened by a drift crosscutting the lode for a distance of 60 feet. The first 20 feet cut into lies in strata more or less indurated and dipping into the hill at an angle of 45 degrees. This is found to be more or less stained by metallic oxides. The drift then entered a pure white pulverulent mass of clay in which occur hard nodules, but still a clay. A shaft has been sunk a few feet in the same substance, other openings having been made on the deposit for a distance of 800 feet, proving its extent and character that far.

Pottery Works.

The town of Oro Grande presents exceptional facilities for the establishment of pottery works on an extensive scale, as it contains in its immediate vicinity all the requisites essential to the business:

1st. Kaolin and clay for porcelain, coarse pottery, and firebrick can be brought from the mine by a gravity tramway.

2d. Water for motor-power can be placed from the river.

3d. Wood from the river's banks can be had at from $3 50 to $4 per cord, also willow for crates.

4th. Coal from Gallup, New Mexico, can be brought here by rail for $8.50 per ton.

5th. The California Southern R. R. or the Santa Fe system can be availed of for transportation of the manufactured products to a market.

6th. Silica, if required, and lead for glazing occur in the immediate vicinity of the town; while borax and soda can be procured from Daggett, only a few miles distant, also connected with this place by rail.

Pottery works, if established here, would give employment to an army of operators and render our country independent of the foreign product in this line.

Whatnot Hill

Is situated 4½ miles northeasterly from Oro Grande Camp, at an elevation of 3700 feet above the level of the sea. Formation, porphyritic, through which courses a quartzite dyke of considerable strength. On and in the vicinity of the contact several stringers and veins of metalliferous quartz occur, carrying the ores of gold, silver and lead. The most prominent and best developed of these veins are the

Whatnot

Strike, north and south walls vertical; ores, carbonate of lead, gold and silver, developed by a tunnel 300 feet in length. Assay value of the ores: Gold, $60 per ton; silver, 20 ounces per ton; lead, 8 per cent. From the adit, four winzes have been sunk 50 feet apart; No. 1, 25 feet deep; No. 2, 19 feet; No. 3, a raise to the surface of 60 feet; No. 4, 30 feet deep. The vein is from 2 to 12 inches wide. The ores are base and require chemical treatment.

The Treasury and the Blind are similar in their general features to the Whatnot, from which they are 1½ miles distant. On the latter, two shafts have been sunk, one 18 and the other 50 feet deep. Ores assay $80 per ton in gold and silver.

These mines are now idle, but they would be valuable properties providing smelting works were in operation at Oro Grande.

Proceeding westerly two miles, we cross the Mojave river opposite Hartman ranch, where there occurs, at an elevation of 2525 feet,

A Vein of Asbestos.

It is situated in the low rolling hills that skirt the river and occurs in a secondary granite formation, with limestone in the vicinity. Here is to be seen an eruptive mass of brecciated rock composed of sharp angular fragments of granite and quartz heavily charged with iron oxides, through the center of which courses a quartzite dyke cropping out boldly. Adjoining and on the southerly flank of the hill, a belt of talcose and chloritic slate occurs, and on the line of its contact there runs a well-defined vein of asbestos 20 feet in width and traceable on its line of strike for 3000 feet. On this deposit two shafts have been put down—one to a depth of ten and the other to a depth of 25 feet.

The fiber of this material is short and mixed with foreign matter containing a fibrous siliceous rock that greatly deteriorates the value of the mass. In all probability, explorations in depth and at other points on the line of the lode would develop a better material—at any rate the experiment would be worth trying.

In a westerly direction and from 7 to 12 miles from Oro Grande, in a low range of hills, are located Galena, North, Central, and West Camps.

North Camp

Lies seven miles in a southwesterly direction from Oro Grande; formation, a magnesian limestone. It contains the following locations, on which but little work has been done:

The Lillie—Strike north 20 degrees west; dip southeasterly 75 degrees; gangue quartz; ore bunchy but rich; assays 234 oz. silver per ton; vein small, carrying brittle silver and chlorides. Vein traceable for 7500 feet, numerous feeders of high-grade silver ore fall in and enrich the veins at their intersection. On the northerly slope of the mountain a group of silver-bearing veins occurs, having a quartz gangue and an easterly and westerly strike, the best defined being the Clip, Springer and Cornet.

West Camp

Lies 12 miles due west from Oro Grande in an isolated mountain; formation, stratified lime, syenite and porphyry, through which runs in a northwesterly and southeasterly direction a series of strong and well defined veins of quartz, carrying the ores of gold, silver and lead.

The Twenty-nine—a three-foot vein with a northwesterly and southeasterly strike, lying between dissimilar walls of limestone, with a quartzose gangue; is highly mineralized and rich in the ores of silver.

Clincker No. 1 has been developed by two shafts respectively 60 and 35 feet deep, lying 600 feet apart; Clincker Nos. 2 and 3 are parallel veins lying 600 feet apart and 350 feet easterly from No. 1.

The Side Issue lies parallel 325 feet west from the Clincker No. 1. This vein is from one to three feet in width and developed by an incline shaft. Ore a copper-silver glance; strike 10 degrees west of north.

The Commercial Lode,

From two to three feet thick, crops for 1500 feet, carrying the ores of copper and gold; walls porphyry and limestone.

The Capital lies 200 feet easterly from the Commercial and courses northerly and southerly; vein from 3 to 26 feet in width; ore averages 15 ozs. silver, developed by shaft, No. 1, 55 feet deep, and shaft No. 2, 69 feet. This vein, which is inclosed between walls of porphyry and stratified lime, is traceable on its line of strike for a distance of 6000 feet. Water for reduction purposes can be obtained from inexhaustible wells 1½ miles distant in the bed of Dry lake.

The lode known as the General lies on the west side of West Camp mountain, in the vicinity of Dry lake. It is developed by a 70-foot incline shaft; ore gold-bearing.

The Boss lode courses north and south, gangue quartz, vein from 2 to 18 inches thick;

formation blue limestone on the east and porphyry on the west; strike north 20 degrees west; ores carry gold and silver varying from $20 to $72 per ton.

Central Camp

Is situated between Galena and West Camp in an isolated butte. The veins here are strong and well defined, with lime on the east and porphyry on the west. They vary from 5 to 10 feet in width, and have been but little developed.

Galena Camp

Lies seven miles westerly from Oro Grande. The hill on which it lies incloses the Lucky Tom Nos. 1, 2 and 3. Vein 20 feet in width; hanging-wall stratified lime; footwall syenite; ores carbonates of lead and silver, developed by a 20 foot shaft.

(To be Continued.)

Working Hours.

A writer in *Chambers' Journal* says: A Turkish working day lasts from sunrise to sunset, with certain intervals for refreshment and repose. In Montenegro the day laborer begins work at 5 or 6 in the morning, knocks off at 8 for an hour, works on till noon, rests until 2, and then labors on until sunset. This is in summer. In winter he commences work at 7:30 or 8, rests from 12 to 1, and works uninterruptedly from that time to sunset. The rules respecting skilled labor are theoretically the same, but considerable laxity prevails in practice. In Servia the principle of individual convenience rules in every case.

In Portugal, from sunrise to sunset is the usual length of the working day. With field laborers and workmen in the building trade, the summer working day begins at 4.30 or 5 in the morning and ends at 7 in the evening, two or three hours' rest being taken in the middle of the day. In the winter the hours are from 7:40 to 5, with a shorter interval of repose. In manufactories the rule is 12 hours in summer and 10 in winter, with an hour and a half allowed for meals.

Eleven hours is the average day's labor in Belgium, but brewers' men work from 10 to 17 hours; breadmakers, 16; the cabinet-makers of Brussels and Ghent are often at work 17 hours a day; tramway drivers are on duty from 15 to 17 hours, with an hour and a half off at noon; railway guards sometimes know what it is to work 19½ hours at a stretch; and in the mining districts, women are often kept at truck-loading and similar heavy labor for 13 or 14 hours.

The nominal working day throughout Saxony is 13 hours, with two hours' allowance for meal-taking. In Baden the medium duration of labor is from 10 to 12 hours, but in some cases it far exceeds this, often rising to 15 hours in stoneware and china works and cotton-mills; in sawmills, to 17 hours, while the workers in sugar refineries, where the shift system is in vogue, work for 24 hours and then have 24 hours free, and in too many of the Baden factories Sunday work is the rule.

In Russian industrial establishments the difference in the working hours is sometimes extraordinary, varying from 6 to 20. It is remarkable that these great divergences occur in the same branches of industry within the inspector's district and among establishments whose produce realizes the same market-price.

Puget Sound Lumber.—A lumber pile made of boards each 100 feet long and six feet in width would be an unprecedented sight in the East, says the Philadelphia *Press;* but a gentleman recently returned from a visit to the Northern Pacific ocean says that piles of timber such as that are common at the mills of Puget Sound. "Boards 100 feet long and six feet wide, without a knot in them," he says, "are common cuts from gigantic fir trees of the Puget Sound forests." These trees grow to the enormous hight of 250 feet, and the forests are so vast that although the sawmills have been ripping 500,000,000 feet of lumber out of them every year for ten years, the spaces made by these tremendous inroads seem no more than garden patches. Puget Sound has 1800 miles of shore line, and all along this line and extending thence on both sides miles and miles farther than the eye can see, is one vast and almost unbroken forest of these enormous trees. An official estimate places the amount of standing timber in that area at 500,000 000,000 feet, or a thousand years' supply, even at the enormous rate the timber is now being felled and sawed. The timber belt covers 30,000,000 acres of Washington, an area equal to the States of Vermont, Massachusetts, New Hampshire and Connecticut.

It is rumored that J. J. Tobin, State Labor Commissioner, is about to commence a systematic crusade against wildcat insurance companies; that he intends by actions in Court to thoroughly ventilate the manner in which some of the assessment and endowment companies have been gulling the public. If he only succeeds in reaching the right companies he will accomplish a grand work. It has been said that some of the old-line companies have placed quite a sum of money at the disposal of Mr. Tobin in order that he may defend himself against suits that might possibly be brought against him by reason of these investigations. We are inclined to discredit this, although Mr. Tobin ought not to be made to bear the expense of defending himself while engaged in the discharge of his duties.

A Californian in Holland.

Dr. W. M. Ryer, owner of Ryer island and well known in discussion of tule-land reclamation, writes from Holland to the *Evening Bulletin* as follows:

Within the boundary of the State of California are large tracts of swamp and overflowed lands which, when reclaimed and subjected to the cultivation they are susceptible of receiving, will by their products become capable of supporting a population equal in numbers to that which now inhabits the entire State. To many persons this statement may appear extravagant, and to others, who have doubts upon the practicability of reclaiming and cultivating these tracts of land, it may seem a declaration which should be followed by the proofs. The misfortunes which have attended the efforts to reclaim the swamp lands of California present many good reasons to doubt a result so important, and if it is not shown to be more from the inefficiency of the means used than from the impracticability of reclaiming this land, then those who doubt do so wisely.

At this time the swamp and overflowed land of California is either in a condition as profitless as when first surveyed or is imperfectly reclaimed and carelessly cultivated. To go upon these dismal swamps and look at them as they are in a natural state, or in the so-called condition of reclamation, it becomes difficult to bring the mind to the belief that upon land exactly the same in the quality of its soil and in its relation to the floods of the rivers and the tides of the sea, there now is maintained and has existed for centuries as high and refined a civilization as can be found among the nations of the earth. In relation to these waste lands of California, it may be said, "What has been done may again be done when like conditions exist." Upon swamps originally like the overflowed land in the Sacramento and San Joaquin valleys and on the margins of the bays of San Francisco and Suisun in the centuries past, a people founded a nationality whose record is among the proudest for deeds of dauntless courage on the fields of battle and for daring and enterprise on the seas.

To give any portion of the military or naval history of this remarkable race is not within the line or intention of this article; the desire is to briefly direct your attention to the mighty works of civil engineering and patient labor done on the lowlands of the Netherlands to illustrate what may be done on the lowlands of California.

The Manner of Reclamation.

The entire Kingdom of the Netherlands contains 12,650 square miles. This is an amount of land equal to a strip of country 42 miles wide and 300 miles long. Such an extent of land could be taken from the San Joaquin and Sacramento valleys and leave a marginal surplus. The number of the population, as estimated upon the last census of 1886, is at this time 4 800 000 people. The larger part of the entire State is protected from the storms and tides of the North Sea and from the currents and overflow of the river Rhine and other rivers of lesser magnitude by sand dunes and by dikes. The land thus protected from the ravages of the sea and rivers is drained by canals, whose water is pumped by windmills and by steam-power into the rivers or the sea, which at many places have an elevation of from 15 to 30 feet above the level of the canals. Do not understand that the greater portion of the reclaimed land in Holland is of a level so low as these figures would indicate, for these depths are only found in such "Polders" as the Haarlem, the Beemster, and perhaps a half-dozen like reclamations.

The last reclamation of importance was made in the construction of the North Sea Canal, extending from Amsterdam westerly to the North Sea, a distance of about 18 miles. This work was commenced by the construction of an immense dam of 1¼ miles in length, across an estuary of the Zuyder Zee, known as the "i j" (pronounced I). In the center of this dam were made five stone locks, three of which are adapted to the passage of vessels and two are for the regulation of the water in the canal. At the North-sea entrance to the canal there are three locks of granite, brick and iron, which act as barriers to the waters of the ocean and permit of the entrance and exit of the largest steamships engaged in commerce between Amsterdam and other seaport cities. This great work was commenced in 1865 and finished in 1876. The canal extending from Amsterdam to the Helder, through which the commerce of Amsterdam was formerly conducted, became insufficient as the tonnage of modern vessels increased.

To realize the importance of this great enterprise, imagine a dam built across the Bay of San Francisco from the drydock or Potrero Point to the nearest shore of Alameda, and at a distance of three-quarters of a mile from the city shore, and in the Bay of San Francisco, five enormous locks of granite, whose foundations are 40 feet below the surface of the water. Now see with your mind's eye two long levees or dikes whose foundations sink nearly 40 feet below the water level, and constructed as jetties are when made at great depth, but water-tight; these levees or dikes running parallel to each other at a distance of 300 feet and extending a distance of 15 miles toward San Jose, and in the middle of the bay.

Now fancy, or bring your imagination to picture, the largest steamships which enter the Bay of San Francisco steaming through this canal, and all the water now in the bay on either side of the canal pumped out, and the bottom of the bay transformed into dry land, upon which an industrious and frugal people have built towns and happy homes, and have cultivated the land into pasture and grain-fields.

The steamships which pass from Amsterdam to the Atlantic ocean course along a canal whose waters are, for long distances, 20 feet above the land on both sides of it. This land was, 20 years ago, the holding-ground for ships' anchors; it is now cultivated into productive fields of grain or is devoted to pasture for cattle and has upon it thriving villages. The immense quantity of water which the bay contained was pumped into the ship canal after the dikes were completed, and by this channel they were discharged into the sea. The land thus recovered from the ocean was sold to the farmers for about $450 per acre, and it thus paid about one-third of the cost of the canal. The city of Amsterdam paid about one-fifth of the cost of the canal, the balance was paid from the National Treasury. As a work of water engineering this canal and the approaches to it from the North sea and the city of Amsterdam, rank among the highest of modern achievements.

To fully appreciate the engineering ability demonstrated by the works of Holland engineers in the construction of dams, dikes, jetties, etc., you should go upon those which are exposed to the storms of the North sea, which at times rage with all the violence of the Atlantic or Pacific oceans. Those who doubt the practicability of reclaiming the marsh lands of California should stand upon the dikes and dams of the Netherlands and the parts of North Germany contiguous thereto when the sea breaks during storms, with all the violence seen at Seal Rock or the entrance of the Bay of San Francisco, upon the outer side of those dams and dikes, while on the inner side, and lower than the natural surface of the sea, the industrious and happy people pursue their usual course of life, having confidence that no danger exists behind such barriers.

Unfortunately, practical water engineering, as taught in Holland, is not taught in any of the collegiate institutions of America. Certainly none of the graduates of these institutions have demonstrated any special knowledge of this subject in the works in California. With works constructed as they are in Holland, the swamp lands of California would be cultivated without fear of overflow, and the product of this cultivation would contribute immensely to the wealth of the State.

Canals of Irrigation and Drainage.

After the land is securely diked, the next work of importance in the reclamation is the drainage and the irrigation. As the largest portion of the reclaimed land in Holland is below the river or sea level, it becomes necessary to dig canals to drain it and to raise the water from these canals to such channels as will carry it to the sea. Holland is a country where the rainfall occurs in every month of the year, and it is more abundant than in California, so that both rainfall and seepage require lifting to higher levels.

In the "polders" or lands reclaimed from the water, the canals are made at distances from 400 to 800 feet from each other and usually parallel. The end sought is to drain the land when too wet, to irrigate when too dry, and to partition the land into fields, the canals acting as fences and as resources for manure, for the vegetation which grows in the water is raked out, put in piles, rotted and spread on the land to enrich it. The reclaimed land of Holland is as productive in grain, vegetables and pastures as the best found in Europe, and seems to have lost but little of its riches, even where cultivated for centuries. This is due to the depth and richness of the soil and the application of manure taken from the canals and the beds of peat. The division of the farms into fields by the canals enables the farmer to confine his cattle on one field, while the others are reserved for the harvest of hay, grain or other products.

The Holland Windmill.

Among the structures illustrated by paintings and engravings until they have become associated with the name of Holland, and come before the mind when it is directed to this country, are the windmills. Comparison of their unique and graceless outlines are made with modern windmills much to the credit of the latter, especially so when the valuable services rendered by the former are lost sight of.

The Holland windmills are usually built upon piles driven into the ground until a firm foundation is reached. They are either round or many-sided, with a base of from 25 to 50 feet in diameter, decreasing in dimensions to their summit, and are of a hight of from 40 to 60 feet. The fans are of great length, usually from 15 to 30 feet, always four to each mill, and made by crossing at right angles two very large timbers of from 30 to 60 feet in length. The fans are made oblique by a framework of light slats, so crossing as to support the sail. Over this frame a canvas sail is drawn when required for use and withdrawn when it is desired to have the mill motionless. The mills are so constructed in the interior that each revolution of the fans will cause, by a system of cogs, many revolutions of an Archimedean screw pump, which is placed at its lower part in the canal of supply, and at its upper part to the canal of discharge, at an incline of about 40°. These screws are from four to eight feet in diameter, and are so incased to confine the water that in a fair wind a great volume of water is raised from the lower to the higher level.

Before the use of steam pumps these mills were a necessity in the reclamation of the swamps of Holland, and as they are very effective and are less costly in their workings than steam machinery, they have continued to keep in a cultivable condition the larger portion of the land. These mills were and are now used as saw and grist mills, and for these purposes they do the work required well. For the simple lifting of water it is doubtful whether modern science has discovered anything better than the Archimedean screw, whether propelled by wind, water or steam; and it is also doubtful whether there are any more effective windmills in existence, or any more capable of resisting the storms and tempests than the windmills which are so prominent in the landscapes of Holland, and which so often suggest the ludicrous to the traveler.

As valuable for the purpose of drainage as are the windmills, it must not be understood that all the improvements of modern steam machinery have been omitted. On the contrary, the steam pumps used in pumping out the waters of Haarlem lake and the bay known as the "I j," at the time of their reclamation, are models of effective machinery.

The Coals of Puget Sound.

The coal measures of the Puget Sound basin consist of alternate beds of yellow and gray fine-grained sandstone and very fine gray arenaceous shales interstratified with many beds of carbonaceous shale and coal. Mr. Willis in his report says: "Looking at the Puget Sound basin as a whole, the coal measures extend from beyond the British boundary south almost to the Columbia, and from the Pacific ocean eastward up into the Cascade range to elevations varying from 800 to 5000 feet above the sea. The coals of this district range in quality all the way from lignite, which still retains a woody structure, to anthracite. The magnificent forests so extensive on the western slope of the Cascades, with their luxurious and dense growth of vegetation, make difficult the development of these coal-fields, as well, also, as the determination of their extent. Coal, however, is known to exist from the northern to the southern boundary lines of the State, through a belt ranging from 10 to 30 miles in width. The general coal formation in the State is placed much the same as that of the anthracite of Pennsylvania, with the sides of the basins dipping at all angles from 15 to 90 degrees. The number of coal beds in the field is undetermined, but, judging from the great number of exposures and the varied character of the beds and rocks, it is large. Those already examined vary in thickness from 1 to 45 feet."

Coal from several different localities has been tested and found to produce excellent coke. With only a few mines developed to any extent, and with a greater number of our most promising mines not sufficiently developed for shipping, there was an output during the year 1889 of 1,000,000 tons, valued at $4 500,000. Of this amount, King county produced 450,320 tons. The output is increasing as rapidly as the capacity and number of mines will permit. The output for 1890 will considerably exceed that of the past year. Shipments from the Gilman mine alone, operated by the Seattle Coal & Iron Co., have been 29 000 tons from January 1st to June 1st. This mine is now producing over 350 tons per day, and as the shaft is extended the quality of coal improves. The total output of coal from Seattle from January 1st to June 1st, 1890, was 201,180 tons. When it is borne in mind that with the exception of two very small mines in California, producing coal of an inferior quality and in quantity not sufficient to be taken into consideration, and an annual output of 40,000 tons of an inferior quality from Oregon mines, there is no other State than Washington on the Pacific Coast possessing coal, the value and future of this branch of industry can be understood.

Immense Deposits of Tin.—Joseph Hare, editor of *The Tin Miner*, of Hill City, S. D., in speaking of the tin mines at that place, says: "Hill City is situated exactly in the center of the tin belt, which is in the shape of a half-moon, and is about 30 miles in length and three miles wide. We are 28 miles from Rapid City, the nearest railroad point. The richness of these mines is simply wonderful, and one who has not been there can hardly believe it, but I state a fact when I tell you that there is enough tin on the dumps and in sight now to supply the United States for five years. As soon as the big mill is started at Hill City, we shall be able to ship the tin out in bars. Some of these mines have been pushed down 240 feet, and the deeper the richer. The vein is eight feet thick, and dips toward the east at an angle of about 45 degrees. Some of the mines average 27½ per cent of metallic tin, and the whole ledge averages 10 per cent. The capitalists interested are mostly New Yorkers and Englishmen. The larger part of the capital is furnished by New York men."

The Seattle *Press* says that California redwood is being shipped to that city in large quantities.

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San Bernardino County.

Its Mineral and Other Resources.

NUMBER XVIII.

[Written for the PRESS by JAMES H. CROSSMAN.]

The Lava-Bed Mining District

Is situated in the Lava-bed Range of mountains, a southeasterly prolongation of the Ord Range, and at a point 26 miles nearly east from Daggett. Formation, syenitic and porphyritic; strike of the strata north 22 degrees east; greatest elevation, 4175 feet. In this mountain occur several powerful veins which crop from 10 to 50 feet in hight and are traceable for long distances on their line of strike. The principal mining locations here are as follows:

The Mammoth.

Which cuts the formation at an acute angle, its course being N. 70 degrees west with a southerly dip of 80 degrees. The vein is of banded structure and carries four feet of good ore. It measures from wall to wall from 20 to 40 feet, and has heavy croppings the full length of the claim. In places it rises to a vertical hight of 25 feet, resembling a mammoth wall. Below the surface the vein has been much broken and disturbed from the effect of volcanic action, non-mineral bearing foreign matter having been injected into the quartz or gangue, reducing the value of the mass. This claim has been developed by two shafts—one 20 and the other 30 feet in depth. The gangue proper is composed of quartz and heavy spar. The assay value of the ores in silver varies from 20 to 95 ounces per ton, and from 5 to 15 per cent lead in the form of carbonates and sulphides.

The Meteor,

An extension of the Mammoth, carries bold, heavy croppings and has a width between its incasing walls of from 9 to 20 feet. Its gangue is quartz and a brecciated mass of volcanic rock. The ores are a soft carbonate of lead, with spots and bunches of galena which run high in silver. It is reported that this mine has yielded in silver values $20,000. The developments consist of a drift on the lode 38 feet, a crosscut 40 feet, with lateral drift of 40 feet. Shaft 90 feet deep, with good ore in the bottom 4 feet wide.

The Rising Sun

Lies parallel with the Meteor on its northerly side. Width of vein 8 feet; formation similar to the Meteor; developed by a 75-foot tunnel, and in the middle of the claim an open cut. Value, 40 to 50 oz. silver per ton.

Five miles in a northerly direction from this mine in the center of a low depression or dry lake, two volcanic cones are seen, their cup-shaped craters being plainly visible in the bed of the largest dry lake, which covers an area of 25 square miles at an elevation of 1920 feet. Two wells have been sunk, the one to a depth of 60 and the other of 90 feet. From these an inexhaustible supply of water is obtained. At a greater depth, in all probability, artesian water could be procured. At the Warm Springs Dry Lake, 20 miles westerly from this point, an inexhaustible supply of water can be obtained but a few feet from the surface, demonstrating that while the surface may be void of moisture, the substratum at varying depths is thoroughly saturated.

The Morning Star Mine

Lies at the extreme easterly end of the Lava-bed Range at an elevation of 3050 feet. The strike of the lode is north 70 degrees west. The comb of the vein rises above the surface to a hight of 35 feet and measures 20 feet between its incasing wall, but carries only four feet of ore, which is reported to assay 30 ounces per ton in silver. At this point a tunnel has been driven in on the lode a short distance; thence in a westerly direction 350 feet on the strike of the vein, a second tunnel has been driven connecting with a vertical shaft sunk in good ore to a depth of 70 feet, where some stoping has been done. From the tunnel level two winzes have been put down 30 and 70 feet. Tunnel No. 3 has been driven in on the south wall of the vein, carrying four feet of low-grade ore, from which a diagonal crosscut has been driven for a distance of 150 feet. The croppings, which are bold and strong, expose some good ore 12 feet in thickness. Two hundred and fifty feet distant, in a southerly direction, a spur falls into the main vein which carries galena assaying 45 per cent in lead and $7 in silver. The spurs and feeders that fall in from the north side of the lode all carry galena; on one of these an 80-foot tunnel has been driven.

The Pequot,

Though a strong vein, has been but little developed.

The Tip Top Vein

Strikes north 70 degrees west; dip 45 degrees northeasterly; vein 10 feet wide; gangue a dark ferruginous quartz assaying $24.50 in gold.

The Everett Lode

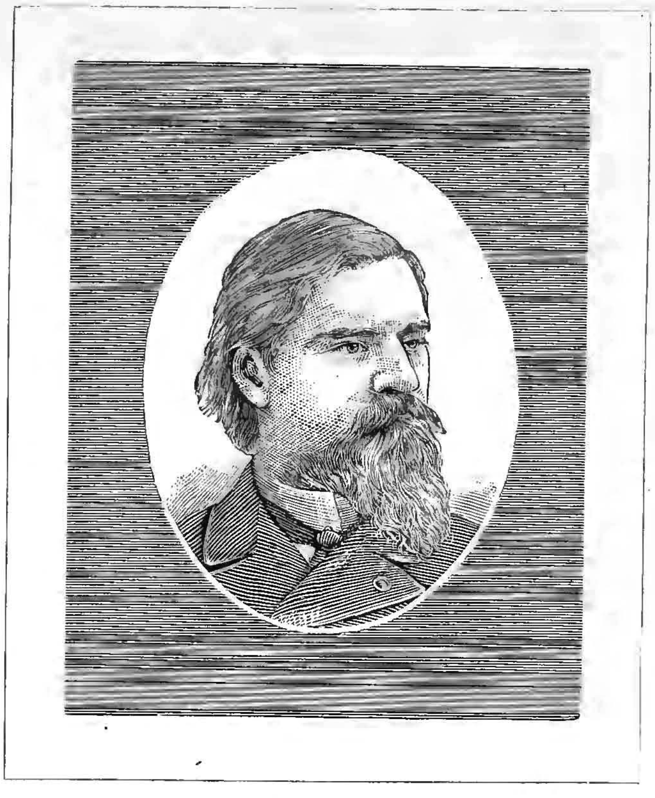
Lies at an elevation of 2950 feet; vein 18 feet wide, carrying four feet of ore which assays nine ounces silver per ton, developed by a shaft 60 feet deep and two drifts respectively 25 and 30 feet long; walls well defined. The ores of these mines are hand-picked and are shipped to San Francisco by the company, there being no reduction works in the vicinity of the mine.

Dry Lake District

Lies immediately south of the Lava Bed, in Tp. 6 W., R. 4 E., comprising an area of 36 square miles. In this district a number of locations have been made, though little work has as yet been done upon them. The ores carry silver, gold and lead. A. F. Lnoas is developing a gold-bearing mine here that promises to prove a valuable property.

The Twenty-Nine Palm District,

Which covers an area of 360 square miles, derives its name from a group of palms surrounding several living springs of pure water which serve to irrigate a considerable area of the surrounding country, now under a good state of cultivation. Several arastras are run here on gold-bearing quartz. This district has been subdivided and the Virginia Dale and Minnie McConckey districts segregated from it. The former is located 31 miles in a southerly direction from Bagdad on the Atlantic & Pacific R. R. and 75 miles from Banning, a station on the Southern Pacific. The isolated position of the mines here has hitherto prevented their being generally known, notwithstanding the strength and persistence of the veins and the unusual richness of the ores, which consist of silver, copper and lead—the latter in the form of sulphides, oxides and carbonates, with chlorides of silver—some of the veins being exclusively gold-bearing. In this district are four locations on a continuous vein four feet in width, known as the Rattler, Virginia Dale, Wilson and South End. In all, some 40 locations have been made. The developments of the Virginia Dale consist of Shaft No. 1, 146 feet in depth, Shaft No. 2, 100 feet deep, connected by longitudinal drifts 100 feet in length, which have been extended northerly and southerly 100 feet farther on the line of the vein. Winzes have also been sunk to depths of from 50 to 100 feet on the vein. Enough stoping has been done to prove the gold-bearing character and value of the ores. The mine is under the management of I. C. Youngman of Pomona—the incorporation being known as the Virginia Dale Mill and Mining Co. The Clip mine, situated three miles to the east, has been developed by a 25-foot shaft, ledge 6 feet between walls, all ore which has paid $20 per ton in free gold by the mill process.



COLONEL GEORGE R. DAVIS, DIRECTOR-GENERAL OF THE WORLD'S FAIR.

In the vicinity of these mines two wells have been sunk 600 feet apart, affording an abundant supply of water. One is 195 feet deep, the other 95 feet. For working the ores of this locality a 5-stamp mill has been erected at a point five miles distant from the mines.

The 29 Palms group of mines is situated from 15 to 28 miles distant in a southeasterly direction, the formation being porphyry and granite, with a belt of limestone lying on the south side; the veins course east and west.

The McConckey mine has been developed by a shaft 100 feet deep. The ores contain copper, lead and silver.

The Minnie McConckey District,

Which was discovered and formed in 1886, is situated 18 miles southeast of 29 Palms, six miles from Lyons mills, and eight miles south of the Virginia Dale mine and range of mountains. The True Business, situated in this district, has been developed by a shaft sunk on the inclination of the lode to a depth of 100 feet. Another shaft 600 feet easterly has been sunk to a depth of 25 feet, both being in high-grade ore, vein strong and well defined, incased in walls of limestone and granite. The ores are reported to carry lead, silver and gold in the proportion of 50 per cent lead, 25 to 75 oz, silver and from $50 to $100 in gold per ton. Six locations have been made on this vein westerly from the discovery and one easterly. An adit level has been commenced which will tap the vein at a depth of 150 feet at a distance of 200 feet. Seven miles distant from the mine a well has been sunk to a depth of 90 feet, affording an abundant supply of water for milling purposes. The croppings on the surface of the vein at its point of greatest expansion vary in width from 25 to 30 feet.

The Big Moequit Mine,

Which lies southeasterly from and three miles distant from the above, carries the same class of ore, but the vein is not so large and with less development. Lying to the north, we find the Politz mine, of a similar character. The Eagle mountain copper mines, situated 20 miles south of 29 Palms, carry copper, silver and gold; vein from 4 to 6 feet in width; value of ore from $60 to $70 per ton. In the vicinity of 29 Palms, a quartz vein 2 to 10 feet in width occurs. It carries a rich streak of gold ore which the owners are working by a hand mortar.

Bagdad district is situated northeast of 29 Palms in the Bagdad Range of mountains and seven miles from Bagdad Station on the A. & P. R. R. A group of small veins occurs here carrying lead and silver. These veins, though small, are persistent on their line of strike and carry 30 per cent of lead and an average of 25 ounces silver per ton. Select samples run as high as $4000 in silver. Some 40 locations have been made here. The deepest shaft is 30 feet; formation, porphyry. The principal locations are owned by Messrs. Corley, Gass & Vickey.

The Grapevine Mining District

Is situated north of the Mojave river and west of the Calico mining district. Its formation is composed of feldspathic, porphyritic and calcareous rocks, much changed from the effects of subterranean heat. Strong and well-defined metalliferous veins occur here carrying the ores of silver and lead.

The Stonewall Jackson mine lies six miles in a northwesterly direction from Baratow, a railroad station, and in the vicinity of the Waterman silver mine. Strike of vein, northwest and southeast, developed by an incline shaft 36 feet deep, Dip of lode for the first 28 feet is 40°, and for the remaining 8 feet, 60°. Vein at bottom shows a width of eight feet between walls; gangue quartz; mineral, galena and carbonates of lead carrying considerable iron oxides.

The Beauregard,

Located on the above vein, has a northerly strike and is of the same character of ore as found on the Stonewall Jackson.

The next adjoining claim on the line of the lead is the Honeycomb; strike northwest and southeast, developed by shaft 9 feet deep and 12 feet wide. The next claim is the No Name; shaft 35 feet deep, all in ore of same character as Stonewall. Another shaft, 200 feet distant on the line of the lode, has been sunk to a depth of 40 feet; inclination of lode, 65°. The Ventura and Jupiter adjoin and are developed by shafts and cuts carrying ore of like character as above.

The Cleveland Mine,

Located on a lone mountain near the Calico district's boundary line, is distant five miles northwest from Daggett and four from the town of Calico. This mine has been developed by an incline shaft 170 feet deep. Vein dips E. 35 degrees. A crosscut shows the width of the vein to be 14 feet, the richest portion lying on the footwall. Hanging-wall, porphyry; foot a decomposed feldspathic rock. Samples of average ore sent to the Selby Smelting Works yielded 26 per cent lead and 20 ounces silver per ton.

The Cuticura,

Which adjoins the Cleveland on the west, is a parallel lode; formation, calcareous shale metamorphosed and changed; strike northwest and southeast; dip, northeasterly at an angle of 60 degrees; gangue, lime and quartz; ores, silver-bearing carbonates and oxides of lead; vein four feet in width and well defined, developed by a shaft 60 feet deep, with several open cuts. Cornish rolls and jigs have recently been erected on the property and as reported successfully and profitably worked; concentrates shipped to Selhy in San Francisco.

On the Midnight, an easterly extension of the Cuticura, but little work has been done. It has, however, the same class of ore with concentrating works. This desert region contains numerous other veins carrying the ores of lead and silver, all sufficiently rich at current rates to warrant treatment by concentration, and in the absence of a smelting plant, to ship the concentrates to San Francisco, for sale or reduction.

The Waterman Mine,

Which has been extensively worked and large values extracted, is by no means exhausted, though now lying idle, litigation having prevented resumption of work here. In the vicinity of the Waterman a vein is being developed that runs high in silver, and the owners have every confidence in the future of the property. This is known as a blind vein, as it did not crop on the surface. It is being developed by a shaft, and judging from the strike it is the same as the Waterman, the character of the gangue and the ore being similar—the first contains baryta and quartz, the latter being rich in the chlorides of silver. Jas. Waters of San Bernardino is one of the principal owners of this mine.

(*To be Continued*)

The Director of the World's Fair.

Colonel Geo. R. Davis, Director-General of the World's Fair, whose portrait we present on this page, was born at Three Rivers, Palmer, Mass., Jan. 3, 1840, and educated in the public schools, and at Williston Seminary, where he graduated in 1860. Entering upon the study of law, he was admitted in due course, but in 1860 forsook his chosen profession to join the Union army. He enlisted in the Eighth Massachusetts Volunteer Infantry, and soon became a captain. At the close of the contest he became a resident of Chicago, still retaining his interest in military matters. He took a leading part in the organization of the local militia, and was made commander of the First Regiment of Infantry, Illinois National Guard, and senior colonel in the State service. In 1876 he was nominated for Congress by the Republicans of his district and defeated, though running largely ahead of the Presidential ticket. Two years later he was more successful and was elected. He was re-elected in 1880, and again in 1882. At present Colonel Davis holds the position of Treasurer of Cook county, of which Chicago is the seat.

BRITISH SHIPBUILDING.—Lloyd's Register Shipbuilding Returns for the last quarter show unmistakable signs of falling off throughout the whole of the United Kingdom. The decline was to be expected from the high rates of materials and wages. The tonnage of vessels building is 123,000 less than the preceding three months; and the number of vessels preparing to be built shows a decline of 87,000 tons. Of vessels at present in hand, more are being built on "spec." than in the preceding quarter; and as compared with the same period a year ago, the falling off in this respect is very marked. On the Clyde there is a reduction of 49 vessels, the number for the last quarter being 114 in place of 163 in the preceding period; on the Tyne there are 66 vessels as compared with 72; on the Wear 47 instead of 59; in the Hartlepool district 50 in place of 59. The tonnage of the vessels under construction is also less in proportion. When materials and wages have adjusted themselves to the altered state of matters, we may hope for a revival, as shipowners are holding off, being unwilling to place orders on a falling market which has not yet by any means reached its lowest point.

MAKING IRON WITHOUT PUDDLING.—Dr. Emmens of Greensburg, Pa., is said to be the discoverer of a process of making wrought iron from pig metal without puddling. A vat is filled with a chemical solution and a number of thin sheet-iron plates. The pig iron is also placed in the vat, and the two metals are connected to a dynamo. The current, which is then passed through the vat, is said to have the effect of causing the pure iron to be separated from the impurities in the pig iron, and to form a deposit on the sheet-iron plates. It is claimed that the wrought iron produced can be bent, rolled or twisted into any shape while cold, and is superior to the best Swedish metal. Dr. Emmens says he can take a horseshoe nail of this iron, fasten the head in a vise, and twist it into an almost perfect screw without breaking it.

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San Bernardino County.

Its Mineral and Other Resources.

NUMBER XIX.

[Written for the Press by James H. Crossman.]

Alvord Mining District.

Alvord Camp is situated in Alvord mountain, in the central portion of Alvord district, at an elevation of 2500 feet above the level of the sea; distance from Daggett, 20 miles; from Camp Cady on the Mojave river, nine miles. This isolated mountain range is unimportant in dimensions, but to the practiced eye of prospector and miner it forms an attractive feature and one that warrants a careful examination. On approaching the mountain from the Mojave river, on its southerly flank a deep canyon is seen exposing its structural formation to a depth of several hundred feet. Its make-up is complex and composed of many varieties of stratified rock—porphyry, syenite, micaceous schist, feldspathic rock and calcareous shales—from the yellow magnesian stone to a coarse-grained carbonaceous marble, coursing northeasterly and southwesterly, and dipping easterly at an angle of 45 degrees. From the mouth of this canyon, in a northwesterly direction, and at a distance of 3000 feet, we reach the

Alvord Mine.

The vein here cuts the formation at a right angle. The gangue is a jaspery quartz carrying free gold, much of it visible to the naked eye. Select pieces are often sufficiently rich to be used for lapidary purposes. The footwall of the vein is composed of a secondary syenitic rock seamed and banded with olivine, its hanging-wall being a coarse-grained carbonaceous lime through which courses at varying angles with the trend of the vein, feeders and stringers of calcspar often found rich in gold, for a distance of from 30 to 40 feet from the main lode. The ores extracted from the mine have been selected and hauled by freight teams to the company's mill at Camp Cady, nine miles distant. The yield is reported by the owner of the mine (Mr. J. B. Osborne) to have varied from $40 to $140 per ton. Large quantities of the lower-grade ores remain in place and on the dump, their values varying from $5 to $8 per ton. The vein, which varies in width from 3 to 18 feet, is traceable by developments and croppings for a distance of 2000 feet—its greatest expansion being near the canyon. The main chute or ore body has a longitudinal extent of 115 feet and an average width of 12 feet.

This mine has been opened by an adit driven from a point 40 feet above the bed of the canyon in a westerly direction on and in the vein for 350 feet, connecting with Shaft No. 1, 103 feet from the surface; thence for a distance of 78 feet, connecting with Shaft No. 2, which is 110 feet deep; thence easterly 40 feet, a shaft has been sunk 35 feet deep in an ore of low grade.

At Camp Cady, nine miles distant, a mill has been erected containing five stamps and two of the largest size Huntington pans, which are kept steadily at work.

No water appears here on the surface except after heavy rains, but the porous sands of the lake-bed, like a sponge, contain a large percentage of water, as has been demonstrated by a number of wells sunk here from 5 to 12 feet in depth.

Joe Dandy hill, which forms a central point of this mineral district, is situated 30 miles north of Ludlow Station on the A. & P. R. R., and 10 miles northwest of Soda Lake Station on the old overland stage-road, at an elevation of 3200 feet above the level of the sea.

Near the westerly border of the district, a low mountain range occurs, coursing northerly and southerly. It is 20 miles long by 4 in width. In its southerly extension at Cave Springs, the Mojave river having eroded a passage, finally sinks in Soda lake.

Two hundred and fifty miners' inches of water can be obtained at Paradise valley, three and one-half miles distant, at a sufficient elevation to convey it to the mouth of the canyon.

Solo Mining District.

Which appears to contain all the elements of success, comprises within its boundary lines a superficial area of 432 square miles, of which the bed of Soda lake occupies a space of 36 square miles—this constituting an inexhaustible source of water supply. From this point the make-up of the range is largely of an eruptive character, in combination with aqueous rocks. Porphyry in immense dykes cuts the formation, as well as the several varieties of limestone. Magnesian, carbonaceous and blue limestone is everywhere seen. Profusely capping the metalliferous veins or coursing with them as incasing walls, lithological growth and decay is everywhere present, the geological structure being sufficiently varied to embody a history of its own. At points where the mines are located, disintegration has performed an important part in exposing the ore bodies along the lode. From the summit of the hill, extending downward in an easterly and southeasterly direction, the mineral outcrop covers a superficial area of 500,000 square feet. Where denudation of the lime cap or blossom has not taken place, exposing the ore body, the cap of lime presents a smooth, unbroken surface everywhere stained and discolored by the hydrated oxide of iron and the metallic oxides, demonstrating the presence of the metalliferous product at greater depth—the cap invariably yielding low assays, but wherever penetrated, high-grade ore is found. The ores are argentiferous galena with their secondary products—carbonates and sulphates of lead and chlorides and sulphides of silver. The gangue is silicious, calcareous, and both overlaid and underlaid by porphyry and limestone. At the point of the greatest expansion, a blue limestone forms the underlie. The names of the principal mines or locations are as follows: The Gambetta, Lydia Hatzel, Grant (Gift), New Year's, New York, IXL, Homestake and Frijole—there being in all 14 locations.

The Gambetta.

Which lies on the eastern slope of Joe Dandy hill, forms the southerly extension of the New Year's, lying parallel with the Grant (Gift) and Lydia Hetzel, which lie on the western flanks of the hill—the intervening space being mineralized, showing spots, bunches and stains of ore in the croppings. A notable feature, and one that is indicative of extensive ore bodies in depth, is that from the surface down to a depth of from 4 to 40 feet, the cap rock only yields by assay from 5 to 10 ounces silver per ton and from 5 to 6 per cent lead, while below that point the value of the ore rapidly appreciates, returning assays varying from 60 ounces silver to $5 to $15 gold values and from 30 to 40 per cent lead. In the Lydia Hetzel and Grant (Gift) the vein matter shows on the surface a width of 120 feet; also in the Gambetta and New York. From the highest point on the hill where the ledge is exposed to the lowest point of exposure, the vertical difference is 500 feet. A large number of assays taken from various points in the mines yielded from 50 to 275 ounces silver per ton, with a *ley* of gold and from 30 to 50 per cent lead. Hand-picked specimens run as high as $13,000 per ton. It is safe to say that the entire ore body will yield 50 ounces of silver and 40 per cent lead. Crossing the southerly apex of the hill is a porphyritic dyke, which, with its companion strata of lime, is 1000x3000 feet—this formation being also mineral stained, showing the thorough mineralization of this section.

Developments.

A tunnel from the north side of the hill has been extended southerly for a distance of 500 feet and will require to be carried 100 feet farther to reach a point under the main ore channel. The Campbell tunnel, which has been driven 75 feet southeasterly through the country rock, intersects the Lydia Hetzel lode at a vertical depth of 70 feet, crossing the vein for a distance of 17 feet. The first 7 feet is free-milling ore carrying 50 oz. silver, $15 in gold values and 10 per cent lead in the form of a carbonate. The next 10 feet carries 40 per cent carbonate of lead with small values in the precious metal. This is known as the first west lode, and is separated from the east parallel lode by ten feet of porphyry (evidently a horse). The caprock is invariably hard, but when cut through the formation it is found to be soft and much decomposed.

Developments on the Gambetta consist of a 12-foot shaft; 50 feet farther west a 12-foot crosscut has been driven in the vein. In both of these free-milling ore occurs.

From the Gambetta, 1½ miles in an easterly direction, another and distinct group of mines occurs, on which considerable work has been done, the mineral contents being of the same general character as those of the Gambetta, with the exception that the ore here carries argentiferous copper in the form of glance. Select samples of this ore have assayed up in the thousands. Wood and water occur in abundance at a point seven miles distant from these mines—the road thence being down-grade to the site selected for reduction works. Strange as it may seem, this promising mineral section is but little known outside of the district in which it occurs. The owners are men of limited means, but being firm believers in the future of their property, will hold it for the advent of the "iron horse," which sooner or later will traverse these desert regions.

Five Point District

Adjoins Solo district on the north and is situated in the same mountain range. In this district ten other locations have been made—the formation, character of veins and ore being similar to that of the mines already described.

(*To be Continued.*)

MINING IN CHINA.—The Mo-ho gold mines in China now employ over 10,000 men, mostly natives of Shangtung. There are four mines. The Government takes four-tenths of the gold extracted, the remaining six-tenths going to the miner. Sometimes a man will get none out of a whole day's work; at other times several ounces will be obtained. The regulations are very strict, and any theft is severely punished. The machinery employed is not got from abroad, but made in a factory near the mines. It is thought that with European machinery the output would be much larger.

COOLIES FOR WORK IN MEXICO.—The new line of steamships between Mexico and China has begun operations. The first three steamers will bring out 2000 coolies for work on the Tehuantepec railway. It is probable that many of these laborers will remain in Mexico, which is in great need, especially on the coast, of a supply of cheap labor. The Monterey & Gulf railway will soon be in full operation between Venadito and Victoria, the capital of the State of Tamaulipas.

The Utilization of Niagara Falls.

A contract was awarded on Saturday last to Rogers & Clemens of this city to construct a tunnel parallel to Niagara river for the Cataract Construction Co. The consideration involved is not announced. A bond in the sum of $300,000 has been executed by the firm. Work will be commenced immediately and must be finished in January, 1892.

In 1886 the Niagara River Hydraulic Power Sewer Co. was incorporated by a special Act of the State Legislature. At various times the charter was amended, and the name finally changed to that of "The Niagara Falls Power Co." In July, 1889, this company awarded the Cataract Construction Co. the contract to construct at Niagara Falls works which will develop 119,000-horse power. Since that time the contractor has been preparing plans and specifications for the work; the sub-contract just awarded is the first decided move which proves to the public that the preliminaries are nearly finished, and that it is certain the works are to be built. At the present time the contractor has a commission in Europe studying plans of plants of similar nature with a view of ascertaining the most practical method of constructing the Niagara plant.

Up to date, plans for any portion of the plant, excepting the tunnel, have not been adopted; consequently the manner of connecting the tunnel with the upper river is not known. There will, however, be a canal either with or without a series of traverse surface conduits, which will conduct the water to penstocks and thence upon turbine wheels. The tunnel, which is to be merely a tail-race, will receive the water from the turbines conducting it below the Falls. The details upon which this tunnel is to be constructed are at hand. It is to start at a point below the Falls under the suspension bridge, extending through the rock to the upper river to a point 6700 feet from its mouth, where a head of 120 feet will be obtained. It will be 28½ feet high, 18 feet wide, with a semi-circular top of 9 feet radius, and straight sides. The fall will be 36 feet to the mile.

The company owns 225 acres of land along the river suitable for millsites, 75 acres under water adjacent to said land, and 1100 acres lying back from the river about midway between La Salle and Niagara Falls. It has been estimated that the flow of water over the Falls amounts to 12,785,455 cubic feet a minute. To develop 119,000 horse power with a 120-foot fall would require but one-fifth of 1 per cent of this volume. From these figures it will be seen that the power is almost inexhaustible. If this plant soon to be constructed proves to be a success—and there is no reason to believe that it will not—the power now running to waste, reaching a figure almost beyond the comprehension of the mind, can be utilized by additional plants of similar nature.—*N. Y. Engineering and Mining Journal.*

THE HUDSON RIVER TUNNEL is being pushed as rapidly as possible from the New Jersey side; about 150 men are now employed and the progress is more rapid than formerly, being about four feet a day. Some 350 feet of iron tunnel is now finished, in addition to the reconstructed portions of the old enterprise. Work on the New York side has practically ceased for the winter. The old tunnel has been strengthened and a bulkhead built at its end. The present intention is to build the shield for this heading on the shore end and sink it into position in front of the bulkhead in the spring. Unless satisfactory arrangements can be made with the French steamship line, which rents the docks above the tunnel, this plan will not be possible, as the shield will have to be sunk directly in front of the entrance to their wharves, and the vessels will thus be prevented from using the docks for some time.

IMMIGRATION continues to increase, and is very large, a sure indication of probable "good times" for some months at least. For September it is 18 per cent larger than last year; for the seven months ending with September, 12 per cent larger. The increase is largely from Italy and Poland, but less decidedly so than it was some months ago. British emigration now constitutes about one-fourth instead of one-third of the whole. The Canadian emigration is not recorded, owing to lack of provision for accurate records, but is really something like one-sixth of the total immigration, there having been in 1880 nearly as many Canadians as English and Scotch living in this country.

NEW YORK STREET CLEANING for the quarter ending Sept 30th, cost $264,411.86, or $105,359.12 less than for the first quarter of 1890, and $83,111.95 less than for the second quarter. The area swept aggregated 314,179,328 square yards, and 355,461 cartloads of ashes and garbage were removed. Of this, 19,850 loads were used for filling city lots and the remainder carried to the sea. The city received $13,886.60 for the privilege of trimming the scows. Fines amounting to $3938 were collected.

THE phosphate mines of South Carolina afford more revenue to the State than ordinary gold mines. The royalty of $1 a ton on the rock removed from navigable streams for the year just ended amounts to $237,150, or $25,000 more than last year's income, and the highest on record.

Successful Trial of an Admirable Steam Road Wagon.

An invention which is bound to prove of much importance to Western lumbermen, farmers and mine-owners, has been tested at the Atlas Iron works at the Potrero. The invention, patented by Californians, consists of a steam road wagon, which promises to revolutionize freight-carrying in districts remote from the railroads. This machine is the patent of Captain Roberts of the Sacramento Transportation Company, and differs materially in construction from any road wagon or traction engine heretofore invented. The usefulness of the old-style steam wagons is almost destroyed for mountain travel, or for work where numerous turns are necessary, owing to the fact that the steering apparatus is too complicated and the power is indirectly applied which prevents the maintaining of any considerable speed without the use of an immoderate amount of fuel. There has for years been a demand among farmers for a road wagon that would do away with the necessity of using horses, which in many localities require one-third of the profits of a ranch to maintain. This trial of the new invention demonstrated the fact that the machine will in the near future be in general use as a freight hauler. It was constructed at the Atlas Iron works for Messrs. Bradford & Way, of Sonora, Tuolumne county, for hauling lumber over the mountains, and is the second of the kind manufactured by that company. The wagon is constructed entirely of wrought iron and steel, there being no cast iron except in the cylinders. It has three traction wheels made of cruiser steel, to which power is applied directly, exactly as on a locomotive. The steering wheel supports one-half of the weight of the machine, and works on an axle horizontal to the axle of the rear wheels, so that the same pistons drive all three wheels. The steering wheel is, however, so constructed with a ball-and-socket joint that the application of power is continued even while the machine is turning at a sharp angle. The truck in front is connected by a hydraulic steering apparatus, which swivels on the ball and joint. The machine weighs about 16 tons and can develop a 225 horse-power and a speed on level ground with a light load, of from eight to ten miles an hour. The intended speed for all occasions, however, is about four miles an hour.

The trial was under the supervision of Capt. Roberts, the inventor, General Manager Jardine of the Atlas Works, Supervisor Noble and S. S. Bradford of Bradford & Way, and the test was a severe one. The trial course was over a distance of about 2000 feet, up a grade of about 10 feet rise to the 100 linear feet. To the machine was attached five wagons weighing two tons each and loaded with 40 tons of pig iron. The machine was started with a steam pressure of 155 pounds, and pulled the enormous load over the course without a stop, having on 185 pounds of steam at the end of the course.

The machine will be shipped to Sonora and will haul 20,000 feet of wet lumber at a load. The wagon bids fair to come into general use on the plains and in the mountains where the engines heretofore have proved too complicated in construction and too cumbersome for general use, while the power applied through gearing was not sufficient for ordinary purposes, and the speed was unsatisfactory.

UNION PACIFIC EXTENSIONS.—As regards the probable extension of the Union Pacific into California, the present situation appears to be like this: The company have made surveys into both the northern and the southern parts of the State, but as to actual extensions nothing has yet been certainly decided upon. The surveys into Northern California were completed some two years ago. The surveys into the southern part of the State were made recently. Three surveys were run, all from Pioche, Nev., southward. One runs to Homer, and another to Ludlow, points on the Atlantic & Pacific road. The third survey runs to a point on the Southern Pacific railroad. All of those surveys were made to furnish to the directors of the company information about the State. At the present time the company is building about 555 miles of new road. The extension from Milford, Utah, to Pioche, Nev., a distance of 145 miles, will be completed by Feb. 1, 1891. Another of our important new roads is the one from Portland to Seattle.

SCARCITY OF NICKEL.—The nickel appropriation of $1,000,000, as ordered by the late Congress for armor-plate, has resulted in the discovery that there are only about a dozen nickel mines in the world, and only three are on this continent. The output of these mines is doubtful, and one source may not be sufficient. Other nations may also see the advantages of the new alloy, and it is said that Krupp's representative is already seeking to gain possession of the Canadian mine. The other two American mines are in Nevada and in Lancaster county, Pennsylvania.

A SCHEME FOR PROTECTING RAILWAYS FROM FLYING SAND is suggested by Prof. Schabler, a German botanist. He proposes to use the roots of the plant *triticum repens L.* The roots are cut in a machine into lengths of 20 centimeters, mixed with a little earth, clay and water sufficient to form a dough-like mass. This is spread with a spade over the sand, and in a couple of weeks it begins to spread and bind the sand.

The Gold Belt of California.

NUMBER II.

The Ancient Placers and Their Relation to Wall Rocks.

[Written for the MINING AND SCIENTIFIC PRESS by STEPHEN BARTON, Kernville, Cal.]

The light of experience must guide us in determining what should constitute wall rocks, and why we should expect to find that in certain localities the ancient channel only grazed the outcrop of the gold-bearing matrix and left the great body of its wealth penetrating the earth to great depths. We must remember, however, in the face of experience, that there is a theory that the wall rock is to the lode merely that of the product of the molders' art, that it gives shape merely to a vein of eruptive matter. If this latter is true, then there is no use of studying geological formation, as a gold-bearing lode may be found wherever a rent may occur in the earth's crust. This latter theory is responsible for half the mining failures that have occurred on the Pacific Coast since Marshall's discovery. It was responsible for the squandering of $50,000,000 in the bottom of the Comstock, below the realm of profitable mining, and finds a place in that portion of the literature of to-day published at public expense. A theory which has wrought so much evil should be able to vindicate itself by reference to some one fact established in its favor, or some one dollar secured as a return for the millions squandered, or it should cease to pretend to the position of a scientific truth. Unfortunately such is not the case. Nine-tenths of our mineral lodes fail to penetrate the earth as deep as the gorges of the modern streams. The great mother lode is broken up, scattered, demoralized or absent in the beds of all the rivers it crosses. Few if any of the explorations in the ridges have reached the level of adjacent river-beds; and still we are to be told, by authority, that the talk of "gold ores" must only excite a smile with scientific men, and that gold is found only in positions consistent with mechanical deposit by eruptive force.

Gentlemen, stand aside; don't allow yourselves to remain a drag-yoke upon the neck of civilization. We will show you that gold is found in certain fixed geological relations; that it exists as a metal, and that it also exists "as an ore;" that it enters into the most intricate combination with many minerals; that it observes the laws which govern the brotherhood of metals, and confuses you only by the fact that it is obnoxious to oxygen.

What rules, then, must govern the geology of a mineral region, and where may we safely look for a paying ledge?

As being first in mineral wealth we will take the calcareous formations. If a lime belt or formation occurs 100 miles wide and of great depth, with no adjacent metamorphism and no intervening formations, the galenas will only carry a low percentage of silver and a bare trace of gold, except near the edges of the formation, nothing more. Where lime dikes of moderate width contact with mica slate, talcose slate, or any of the highly silicified or metamorphic rocks, whether eruptive or otherwise, minerals containing any or all of the metals may be looked for in or near one of the contacts. This rule may be carried up through all the grades of calcareous and carboniferous slates. In many places numerous small veins rising in the granite a mile away will be seen heading for the contact and expanding into a complicated system as they approach. But as most of these lime formations trend south about 24° east in California, and as there is a very marked difference between the conditions observable in the two walls, I will leave the explorer to determine for himself some of the mysteries hidden there. For 15 years I have been fully impressed with the idea that the vicinity of the calcareous contact not only gave birth to a high percentage of the gold of the ancient placers, but that the adjacent lime, acting upon the silex and sulphur of the matrix, released the gold and offered it to the current in its present form.

I have no theory to which I have not been involuntarily led by observing facts. So far as my observations go, what is known as pocket mining, where fortunes have been realized in a day, were all near the contact of a calcareous formation. If we accept this as a rule, we shall see how very little of the wealth of the earth's crust is exposed to man's grasp. Take the bed of Owens valley, where the granite and the silurian rocks meet. We see this decomposition is going on, the sulphur, the lime, the silex and the soda, the boracic acid and potash, are being carried forward by decomposition; but the contact itself is left to the realm of seismic forces. On a smaller scale the same rule will apply to the valley of Kern river below Kernville. This latter formation expands a few miles to the southeast of Kernville, and before dipping beneath the desert near Mojave station, on the railroad, is seen to offer one of the most promising of unexplored regions, and from its trend is doubtless part of the system lying east and north of the San Bernardino range. There may come a day when the tremendous amount of oxygen required to metamorphose those older rocks and give them a granitic cast may inflate the Owen-river region into a mountain, and then there will be good mining there. While the lime itself will not be metamorphosed into granite, it will yield up its sulphur now combined in the form of gypsum and become a more perfect granular mountain limestone.

When we see where granite has been in the melted form, and has run in a regular flow, and now reposes on the broken outcrop of vertical slate; when we see silurian slate half metamorphosed into granite; when we see the immense gain of oxygen in these altered forms, and see the escape of sulphureted hydrogen from the contact, and conclude that for a certainty water is surrendering its oxygen to the granite, we say this is the place where granite is made; and when the action is rapid, the movement shakes the world. Such forces have elevated vast areas and have left us dead-river channels far above the beds of modern streams. In the conversion into granite the bulk of the rock is nearly doubled, while its ponderosity is increased, there being in a cubic foot of granite once and a half as much weight of oxygen as the whole weight of a cubic foot of water. In a Pickwickian sense, our lost rivers may be said to be engaged in the laudable work of elevating real estate.

There must have been a time when silex and sulphur were combining with metals and forming themselves into solid lodes. There doubtless was another time when this same sulphur, under other circumstances, was aiding to decompose the quartz and to soften the walls of the lode. It required millions of years to work these changes. While these changes were going on the forces employed were converting the lode into one vast voltaic pile, the earth itself was a vast magnet, and these, acting in harmony with the law of affinity, which gives to each angle of crystallization its own substance, were drawing the atoms into grains.

The forces which elevated the ancient river-beds may have hardened subjacent formations, and the incasing walls of the lodes which imparted their wealth to the ancient rivers may have been soft and friable. The sulphurets in the lode may have been decomposed and the gold thus exposed to the current as denuding occurred. On any smaller scale we know such chemical changes would beget electric currents, and we know that the earth is a great magnet. We know that the electric current revolves only upon the surface of the magnet. We know, further, that wherever met with it is engaged in transferring metals in solution. Let us add now one other fact. Eruptive forces have not occupied the metal-bearing fissure since the formation of the matrix only to destroy it.

There may be chemical agencies at work in regions noted for the display of eruptive force. There are certainly chemical agencies at work where no such force has ever been directly manifested. Perhaps it will be urged that the two forces differ, mainly in intensity. I grant this affinity of origin, yet the presence of an eruptive force is not the place for the formation or the perpetuation of the gold-bearing matrix. Let us learn to discriminate between chemical and physical results. Let us learn to scout the idea that the fighting qualities of the soldier are fortified by mixing gunpowder with his brandy.

If the earth is a great magnet and magnetism has anything to do with fixing the position of the metal in the lode, then there must be a difference in the character of the deposit on the two sides of the lode. Some one will say, "Oh, yes, there is a difference between the foot and the hanging-wall, but what I want to know first is which is the hanging-wall? The magnetic needle points to the north. Electric currents run at right angles with the course of the magnet. Now how do these suggestions fit the information about the hanging-wall?" Let us change the form of inquiry. "Is the diabase in the west wall, or is the great field of granite there? Is there calcareous slate or serpentine back of the diabase?" Let us know something of the surroundings. Never mind the "foot and hanging-walls," except you give something of those. We have started out for original research. We have squandered our money by following a beaten path long enough. The object was to try to give some suggestion as to where the gold of the ancient placers came from. It was not intended to refer the mining public to Webster's dictionary for the information, nor yet to Dana's "Elements of Geology." The object of the discussion is to try to discover something which no one knows, and yet what every old placer miner would like to know.

(*To be Continued*)

EIGHT HOURS A DAY.—Regarding the enactment by law of eight hours a day, or 48 hours per week, as the maximum amount of work for adults, it may not be uninteresting to make it known that in the weaving factory at Edenderry, near Belfast, which is the property of Messrs. John S. Brown & Sons, who are well known among the foremost in the production of the finest damask table-linens, doylies and cambric handkerchiefs, the question has been put to a practical test by their enterprising manager. Some two or three years since, Mr. Kirtland, the gentleman referred to, became impressed with the idea that he could reduce the period of weekly labor to five days, and give an entire holiday on Saturdays to all his workers without injuriously affecting the interests of either master or employe. Having now had two years' experience, although the system was only at first tried as an experiment, he finds that all concerned are so well satisfied that they would, on no account, return to the old method. Briefly, the advantages gained have been: An output equal to and even greater than before; the saving of steam, fuel, oil, etc., to the firm and to the workers; Saturdays to themselves, with wages equal to what they formerly earned in six days, because knowing they would be off on Saturdays, they are as anxious to make up their pay as their employer is to grant it. It has also been observed that there are fewer absentees on Monday mornings, and far less broken time. Should any employer or manager wish to try the experiment, particulars of the method of arrangement and system of working it may easily be obtained. It may serve better to elucidate the pros and cons of the discussion than hours spent in theorizing on the platform of St. James' hall.—*Journal of Fabrics.*

SENATOR SHERMAN'S PROPHECIES.—Senator Sherman spoke at the Old City Hall, Pittsburg, Saturday night week, to 4000 persons. In discussing the tariff, he said: "My fellow-citizens, I am as positive as I am of my existence to-day that within ten years from this time we will produce every pound of sugar that is used in this country on our own farms. [Applause.] The farmer will raise the product, and the manufacturer will build these great machines to press out the juices and reduce it to sugar, and thus a great industry, probably employing 100,000 people in this country, will soon be built up in our country. We have put a duty on tin plate equal and a little more than the duty on sheet iron, and the result is we will manufacture in this country of ours within a very short time—and you Pittsburg people especially, because it was largely upon your influence and upon the influence of others that it was done—we will make within five years of this time 360,000 tons of plate tin, and we will make the tin cup so cheap that nobody will growl but the Democrats. Why should not we do it? I am told that now already in Baltimore they are getting ahead of you. They have a capital organized of $7,000,000 to go to work to make tin plate, of which we import now 360,000 tons, and if you Pittsburg people don't hurry up you will get behind in this race, and you ought to be in the lead."

TRANS ANDINE RAILROAD.—The year 1892 will probably be signalized by a most interesting event in civil engineering and in international overland commerce. This will be the completion and opening of the Trans-Andine railroad, the first to cross the continent of South America. It is 19 years since this work was begun, and it is now confidently expected that it will be finished by the beginning of 1892. The road is to run from Buenos Ayres to Valparaiso, a distance of 871 miles. There are now 640 miles of it finished at the Buenos Ayres end, and 82 at the Valparaiso end. Of the remaining 149 miles about one-third is practically complete, and the rails laid. The passage of the Andes is accomplished at the Cumbre Pass, which is 13,045 feet above the sea level. The railroad, however, does not reach the summit of the pass, but pierces the mountain by means of a tunnel more than three miles long at an elevation of 10,450 feet above the sea. The grades are, of course, very steep. For a considerable distance the rise is more than 422 feet to the mile, or 1 foot to every 12½. On this portion of the line a rack rail is employed similar to those on the Hartz and other mountain roads. One unfortunate feature of the road, which will seriously impair its value, is the diversity of gauges adopted. The different sections of the road have been built by different companies, and each company has its own gauge.

MR. JOSEPH M. HIRSH, the chemist who claims to have a process for extracting aluminum from common clay, has again been heard from. This time he is alleged to have confided his process to a Chicago newspaper reporter, whom he first swears to secrecy. He is quoted as saying: "I have solved the problem of extracting the metal (aluminum) from an *aqueous* solution; the process has been so simplified that it is exceedingly cheap (a few cents a pound), and requires but little labor." In the face of this statement of the simplicity and cheapness of the process, Prof. Hirsh is taking steps to receive the benefit of a very extensive backing; the Chicago Aluminum Company, which he is organizing, is to be capitalized at $1,000,000. Prof. Hirsh may have a process for manufacturing aluminum, but until he explains to the scientific world the manner in which he proposes to obtain aluminum from an "aqueous solution of common clay," he will not receive much credence among chemists, nor, it is to be hoped, much support among capitalists. We have received a long and irrelevant communication from Mr. Hirsh which in no way replies to the doubts cast upon the character of his enterprise. So far as our investigations have gone, we have no reason to modify our advice to investors that this is an excellent thing to let alone.—*Eng. and Min. Jour.*

IT is estimated that wheat and hops will bring into the State of Washington this season about $12,000,000, lumber and coal about $15,000,000, and that railway construction will bring in $20,000,000 more within 18 months. Add to this the receipts of ore, fruit and minor products of this wonderful State, and some idea of the wealth of Washington may be formed.

FALL RIVER citizens are discussing the project of erecting a large building on the lot adjoining the postoffice, to be rented to small manufacturers with power. The scheme is feasible and is meeting with much favor.

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San Bernardino County.

Its Mineral and Other Resources.

NUMBER XX.

[Written for the PRESS by JAMES H. CROSSMAN.]

The Silver Valley Land and Water Company—A Submerged Dam.

In a former article of this series we referred to an important enterprise that was being inaugurated for the purpose of diverting and utilizing the sub-surface water of the Mojave river, which, during the summer season, is largely absorbed by the loose, gravelly sands in its bed—the water in this stream appearing and disappearing several times until it finally disappears in what is known as the sink of the Mojave.

At the date of the writer's examination of this property, four months ago—though the scheme had been ascertained to be thoroughly practical and the organization of the company was completed — the work of development was in an embryo state, little having been done. Since that time the energetic managers and promoters of the enterprise, Messrs. Rhea and Silver, have with a large force of men excavated a long line of canal and prepared the river-bed for the commencement of their dam, which will take from two to three months to complete. The conservation or reclamation of sub-surface water by the so-called "submerged dam system," though to us new, is by no means a modern invention—it having been practiced for many hundred years in the sandy deserts of Egypt and India, and the waters used for irrigation purposes—bountiful crops being raised where before nothing could be produced. It is a well-established fact that wherever deep soils are found in a desiccated country they are wonderfully rich in the element of fertility, provided water can be procured for irrigating them. The originators and promoters of this scheme, Messrs. Silver and Rhea, are deserving of great credit, as it has now become an assured fact that the work will be speedily completed and water be running in the canal early in the coming year. It is a trite but none the less true saying that the man who makes two blades of grass grow where but one grew before is a public benefactor; and these gentlemen, assisted by their company, propose redeeming a large area of territory that is now barren and valueless.

As an enterprise of so much importance requires more than a passing comment, I will furnish a detailed description of their *modus operandi*, specifications and plans, for the benefit of your readers—there being many other localities where the same system can be advantageously used.

The Dam.

One thousand six hundred feet long from rim to rim of the river channel, has a minimum depth from water level to bedrock of 2 feet 2 inches; maximum depth, 24 feet; mean depth, 12 feet; depth from surface to the water-carrying stratum from 0 to 8 feet. The bedrock proper is composed of a micaceous granite, overlaid by from 2 to 6 feet of tough clay.

The preliminary or holding dam will be constructed of a double row of sawed piles of Oregon pine, with lap joints of the following dimensions: The lower row to be 6 by 16 inches; the upper lap row to cover joints 4 by 12 inches. Iron caps to be used in driving, if needed, and shoes if required to penetrate the formation overlying the bedrock.

After the completion of the pile dam and the water and sand are held in check, there will be built below it a solid dam of masonry composed of rock and cement. There being no rocks or bowlders in the river-bed, the piles can be easily driven to bedrock.

The Canal.

This portion of the work, which is being constructed 30 feet wide on top and 20 feet on the bottom, is designed to carry a mean depth of 5 feet of water. The bottom of the dam at its head will be 4 feet below the water level in the driest season of the year. The width of the canal at its head will be 100 feet, gradually decreasing until it reaches its normal width, thereby giving a free opening for the ingress of the water. The capacity of the canal is estimated at 18,000 miners' inches, which can be increased to 25,000 by building dikes or levees for 300 feet along its lower side. Above the head of the canal, at a proper distance, a jetty or breakwater will be constructed of sufficient strength, hight and length to divert the flow of both water and sand with proper gates to admit the water if required.

The Formation

Filling the river-bed is as follows: The water-carrying strata contains of

	Per Cent.
Water	22
Rock, average size of 4 inches	16
Rock, average size of 1½ inches	36
Sand and small gravel	26
Total	100

The grade of the river at this point is 14 feet to the mile; grade of canal, 3 feet to the mile; formation on line of canal for three miles is a stiff clay, ½-mile rock.

At the point of discharge the canal commands a 45-foot drop of its contents, which gives that much pressure head. At this point sufficient water will be taken from the canal to propel a Pelton wheel which will be used to drive motors and dynamos, as much electric-power being generated as may be required for manufacturing, milling and other purposes, either at the point of discharge or at any other points within a radius of six or eight miles. This power can and undoubtedly will be utilized for reducing the almost inexhaustible quantities of low-grade silver ore that exists in the Calico mountain, but which cannot be profitably worked by steam, with coal costing from $9 to $10 per ton, as at present. The tufa belt alone of Calico, which is at least 3½ miles long by 200 feet wide and of unknown depth, would produce ore enough to run 100 stamps in all probability for a generation. The ore is soft, and so situated that it can be worked by quarry for a long time. It is free-milling, but low grade. There are now steadily running on Calico ores over 100 stamps, reducing 300 tons of ore daily, using steam for a motor.

The point referred to as the discharge point of the canal is in close proximity to the Waterloo mill of 75 stamps, 3½ miles from the Barbee and the Runover mills, and but a short distance from Daggett, on the line of the Atlantic & Pacific R. R., forming a suitable place for reduction or smelting works on an extensive scale, as it would command the ores of a large area of mineral country—gold, silver, copper and lead. At a point 11½ miles below the above, a reservoir site has been located having a capacity of 20,000,000,000 gallons, which can be dammed at a nominal expense and be used to irrigate an immense area of agricultural land. Dimensions of reservoir site, 3 miles long, 1¼ miles wide, maximum depth, 80 feet, mean depth, 30 feet.

Such surplus water as will not be required for power purposes will be conveyed in a canal to the above-mentioned reservoir a farther distance of 10 miles. The canal for the entire distance commands a tract of irrigable agricultural land 20 miles square. The soil is deep and of wonderful fertility, only requiring water to germinate the seed. It is especially adapted to the culture of the fig and raisin grape. The dryness of the atmosphere and absence of rain during the summer months assists in curing the grape. The soil is also adapted to the growing of all semi-tropical fruits—the date palm, orange, lemon, etc. Wherever water can be obtained, six crops of alfalfa per annum can be produced. Each acre will yield from two to three tons of barley or of the other cereals.

The sweet and the Irish potato and all other vegetables do well here. Fruit matures in this region from two to six weeks earlier than in Los Angeles, and is one day nearer the Eastern markets, making a saving on freight alone of $100 per carload.

On the completion of the Utah Southern R. R., which will soon be extended to a point near Pioche, Utah coal suitable for smelting can be delivered at Barstow for $5 per ton, which will greatly assist in the opening up of a large extent of mineral-bearing country in this section of the county, most of which is now valueless, though known to be rich in minerals.

(*To be Continued.*)

THE rallway mail service of the United States has during the past 2½ years been increased at a most wonderful rate. Fully 25,500 miles of new road were added. The greater amount of new routes was in the West. By attaching mail cars to the fast-limited trains all over the country a much more expeditious delivery was secured. New York and San Francisco have thus been brought a day nearer to each other.

GLASS HOUSES AT SAN GABRIEL FOR THE PROTECTION OF VEDALIA CARDINALIS THROUGH THE WINTER.

What Constitutes an "Accident"?

The full-page engraving—"Accident in a Machine Shop," reproduced in this paper last week, was not only a pathetic picture but a very suggestive one.

Nearly every morning last week readers of the daily papers were treated to one or more railroad disasters, with a regularity that would have been monotonous had they not in every instance involved losses of life, limbs and property.

Only a few days ago a lake steamer was burned, causing the deaths of eight persons.

And these were not a tithe of the so-called "accidents" that happened during the week in the Northern States.

The question naturally arises, is it necessary that these casualties occur so frequently, and with such regularity? We hardly believe, with the guide of our youth, that "there is no such thing as an accident"—by which he meant that all casualties are the result of human error, such as miscalculation, drunkenness, carelessness and mischievousness. Yet, in a large proportion of the cases reported by the press, were they all traced to their sources, one or more of these causes would be found responsible for these occurrences, as they have been for many generations past, and probably will again in years to come.

It may be that "corporations have no souls," and, consequently, no moral responsibility for the lives and limbs of those intrusted to their care; but the steamboat or railroad company which confides the care of its passengers and employes to a drunken or careless engineer and fireman, is at least responsible for its own losses, and should be considered so for the losses of others whose lives and property are thus placed in jeopardy.

There should be stronger, surer safeguards thrown about the traveling public than now exist. If the corporation managers are responsible, let them be held so by the authorities, and if the subordinates have infringed the regulations made by the managers, let the proper penalties be visited upon them. The public is not supposed to know where the responsibility should lie; neither is the ambitious reporter, who generally assumes too much on the start and goes off at a half-cock, only to confuse all the after proceedings and mislead his innocent newspaper readers. But the truth should come to light and the thongs of justice be felt, let the blows fall where they will.

So in the great machine-shops of the country, from business manager to shopboy, there should be some one held responsible, directly or indirectly, for every casualty, and every disaster be traced to the guilty party, even to the outside dealer who supplies the defective belt or the fractured gear-wheel.

On the other hand, there are sometimes mysterious occurrences, usually termed "divine providences," over which human foresight and human precautions have no influence. But these instances are rare. Accidents do not often happen without a tangible cause. A man may be stricken down by lightning, and if there has been no heedless exposure of his person to the electric current, the responsibility cannot rest upon himself or any other person. But it would be very difficult to place the unfortunate in any other circumstance so utterly devoid of human responsibility as that. And if human responsibility is at fault, it should stand or fall before the influence of public opinion.—*Chicago Journal.*

Exploring the Canyons of Colorado.

Colonel Holabird, of Los Angeles, has just returned to California from an exploring expedition in the canyons of Colorado. He penetrated districts never before explored, it is said, and found in an almost inaccessible canyon 100 miles north of Williams, and near the Grand Canyon of the Colorado, the Yava Supai tribe of Indians, who had never seen any white man except John D. Lee the Mormon, who was shot for the Mountain Meadows massacre. Colonel Holabird in relating his experiences to a New York *Tribune* correspondent, said: "These Indians are of the Apache family, but of ancient origin. The men are magnificent specimens. The valley in which the tribe has lived for many years in seclusion has only two ways of approach. It contains 2000 acres and is inclosed by almost perpendicular walls 4000 feet high. We traveled over 15 miles along a canyon over a lifeless country. Suddenly we came to two boiling springs under cottonwood trees. From these springs a river starts, which winds its way through a luxuriant valley. The water in the river is as clear as crystal and so strongly impregnated with lime that it petrifies everything it touches. There are three immense cataracts in the canyon. These look as if centuries ago a huge cottonwood tree had fallen across the stream and lodged. Mosses, ferns and creepers formed a barrier; all these turned to limestone. The grass caused the deposit to increase until the barricade extends across the canyon making a fall of 250 feet. Along the front of these high cataracts limestone ridges have formed 20 to 50 feet one above the other. Over all these the water falls like a sheet of glass. Underneath, between the ridges, thousands of plants with flowers in full bloom are seen, while millions of humming birds dart in and out. The chief of the strange tribe is an old man of 60, 'Captain Tom.' The name was given him by John D. Lee. I found these Indians in a starving condition, subsisting on berries and grass seed. I appealed to the Government for them, but the Indian Department said it couldn't help wandering people." General Miles, who says he has heard of these Indians, but could never get a guide to their canyon, will investigate their condition.—*Phila. Public Ledger.*

PRIESTS AND POLITICS IN JAPAN.—The position to be taken by the priests of the various Buddhist sects in Japanese politics, and especially during the first general election, has been a matter of much interest, in view of the widespread influence, the energy, activity, and occasionally exceptional ability, of members of the Buddhist priesthood. When the text of the constitution was under consideration the famous Monto sect sent delegates to Tokio to urge the authorities to allow their Order the right to elect and be elected to the House of Representatives. A politico-religious association known by the high-sounding title of "Sovereign-revering and Buddha-believing Grand Combination," which has recently been established, is supposed to be mainly composed of priests. However this may be, the chiefs of all the Buddhist sects lately met in one of the principal temples of Tokio to discuss the subject of the priests' duties in regard to current practical politics and to lay down certain rules for their guidance. The result of the conference was a series of resolutions to the effect that no priest should be permitted to join a political party, that a priest should under no circumstances whatever be allowed to labor for a political party, and that every priest should be enjoined to warn his flock against the danger of allowing political differences to interfere with social intercourse, and against breaking the law through political zeal; and that under no circumstances shall either the principal hall of a temple or any other sacred building be lent for the purpose of holding political meetings or delivering speeches connected with political parties. These resolutions, with appropriate instructions, have been circulated by order of the head of each sect to every Buddhist priest in the country.

What Invention Does.

The great perfection attained in cotton manufacture and its wonderful development within the past century, are due to the inventive skill and untiring energy of the mechanicians of this country. In 1793 the saw cotton-gin was invented by Eli Whitney, a citizen of Georgia, and the importance of this invention to the cotton manufacture cannot be overestimated, for it was the one thing needed to insure a sufficient supply of the raw material to meet the requirements of the increasing machinery for spinning and weaving. The result of Whitney's invention was the rapid extension of the culture of cotton and its permanent establishment as one of the leading staples of the country. Previous to the introduction of the "saw-gin," lint cotton had been separated from its seed by the use of what were known as "roller-gins." The process was almost identical with that in use in India centuries ago, and was slow and expensive, whereas the new gin separated lint from seed in much less time and at much less cost than had been done by the old plan; as it also increased the quality of lint made from "seed cotton," it is easy to see how this invention greatly enhanced the planters' profits, and thus gave a great stimulus to cotton-planting. The first establishment of which special mention should be made was that of Samuel Slater, whose centennial has just been celebrated, who made with his own hands a series of Arkwright machines and started at Pawtucket, R. I., a cotton-spinning factory. Taking the waterwheel of an old fulling-mill, he used it to give power to three carding, one drawing and roving machine, and 72 spindles. As the cotton of the Southern States was then badly cleaned, his supply was drawn from the West Indies, and in 1794 he made the first cotton thread, and from the small amount of 500 bales consumed in 1800 the industry now finds employment for over 200.000 persons and uses over 2,000,000 bales of cotton.—*St. Louis Dry Goods Reporter.*

MR. W. BARNET LE VAN has for years been laboring at a system of pneumatic propulsion for passengers as well as for freight. London has a pneumatic freight line which carries a car five miles in seven minutes, and Mr. Le Van is assured that the darkness is the only unpleasant feature of the trip. He anticipates that within a few decades a pneumatic tube line will carry passengers from Philadelphia to New York in 20 minutes. In fuel and other respects he looks for a large saving. Mr. Le Van concisely explains his plan, and such a plan may be possible; but as Macaulay well says: "Any statement, not involving a contradiction in terms, *may* be true." The world has grown as weary of air-navigation schemes as of alchemy. Every new project dwells on the fact that ideas once ridiculed have found universal acceptance and ignores the corresponding fact that ideas once popular have failed to stand the test of time. With two of Mr. Le Van's statements, however, we express our fullest concurrence: "Some objections may be raised to underground roads of this kind. For instance, persons of a nervous temperament would probably be timid about trusting themselves in the cars at first."

THE Director of the Mint has promptly explained in his letter what the Mint has done in answer to the complaining stockholders of the Comstock. Undoubtedly these gentlemen will, in due time, give their view of the case and state the reasons they have for considering as unsatisfactory the investigation of the Carson Mint, referred to by Director Leech; and if they can show good cause for asking it, we have not the slightest doubt the Director of the Mint will do anything that may be necessary to keep the management of any and all of the local mints above the reach of suspicion.

ANOTHER English syndicate has scooped up more important industries in this country. The new company is known as the American Stove and Furnace Company, and have secured control of the Magee Furnace Company of Chelsea, Mass., the Smith & Anthony Stove Co., and other small concerns and mills to consolidate them. They have a capital of nearly $2,000,000,

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San Bernardino County.

Its Mineral and Other Resources.

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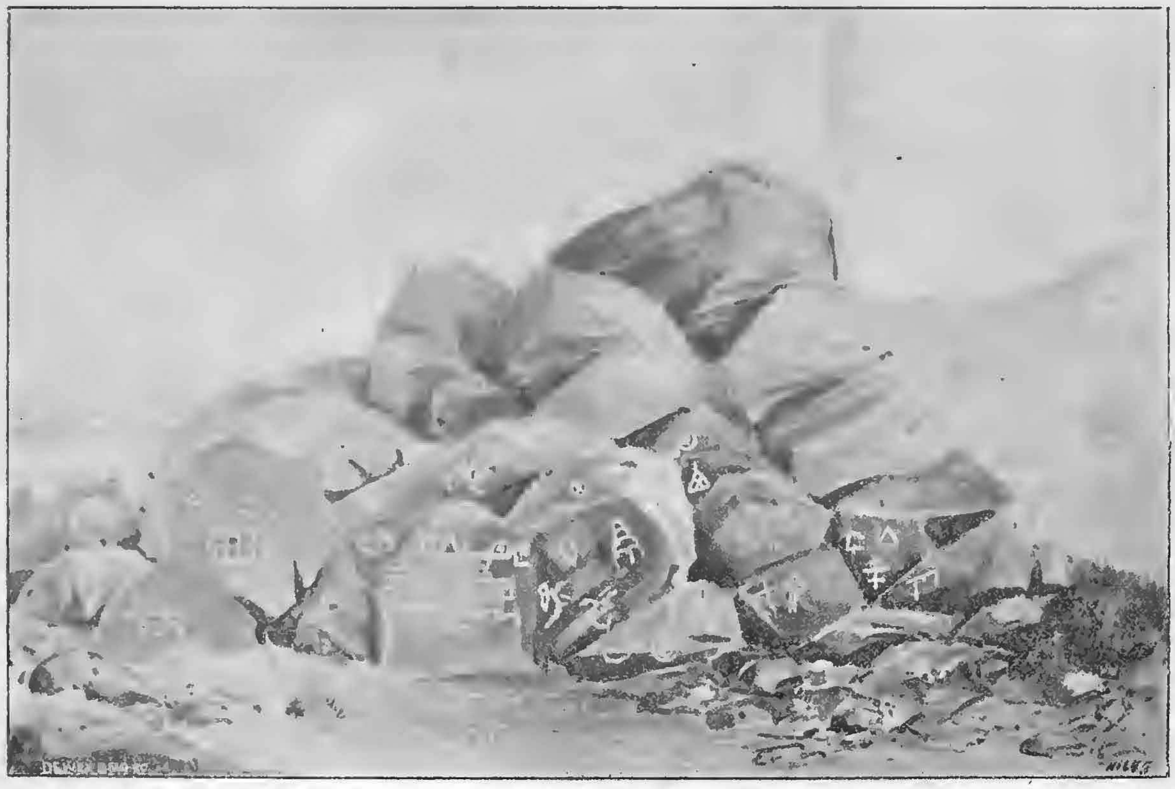
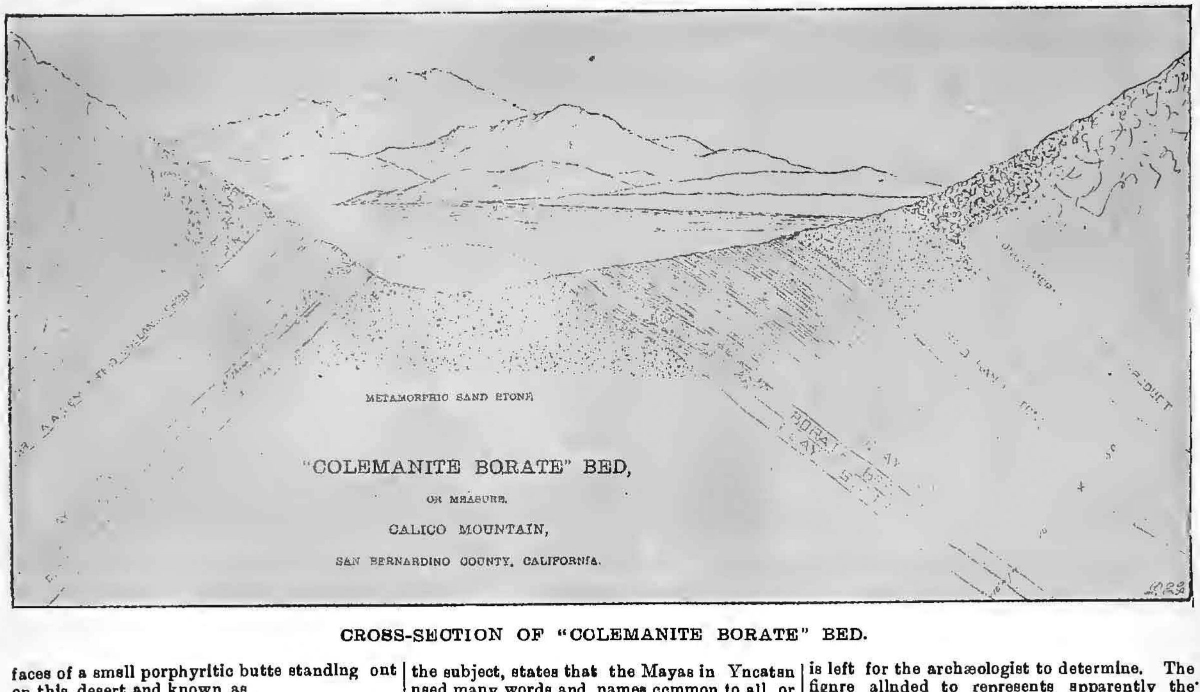
[Written for the PRESS by JAMES H. CROSSMAN.]

Hieroglyphics on the Desert. Food for the Archæologist and Ethnologist.

Having shown how, through the agency of the Silver Valley Land and Water Company's water scheme, a large portion of the Mojave desert can be rendered productive and habitable, we have, it would seem, sufficient evidence to prove that at a comparatively recent period, geologically speaking, this region of country contained a considerable population, and to support a population, there must necessarily have been vegetation. To say the least, we find here evidences of man's handiwork in the sculptured characters to be seen on the faces of a small porphyritic butte standing out on this desert and known as



HIEROGLYPHICS ON A PORPHYRITIC BUTTE IN THE MOJAVE DESERT.



CROSS-SECTION OF "COLEMANITE BORATE" BED.

Rattlesnake Rock,

This name having been given it by reason of the immense number of these reptiles that find shelter in this mass of rocks. This butte is situated about two miles north of Daggett and 1½ miles east of the Waterloo mill, standing solitary and alone on the barren plains. It is seldom visited and but little known, not being on the line of travel. It was called to the attention of the writer by Mr. J. Alderley of the Waterloo mine. Visiting the spot, a sketch of the rock and the hieroglyphics engraved thereon was made—the same being represented in the cut herewith given.

The implement used in making these characters was evidently a dull-pointed stone, as the lines are not sharp and the sides of the indentation show marks of striation. That these characters are no erratic figures emanating from the brain of the stupid and ignorant aborigine of the present day, is very evident. They were formed by the hands of a superior race who had acquired the art of recording their ideas and history in symbols and characters, and who possibly may have been allied to the mound-builders that at a remote period populated the American continent from Lake Superior on the north to Bolivia on the south, Yucatan and Central America being the central point of this civilization, which must have been somewhat advanced, judging from the works of art, ruined cities and other monuments of progress to be seen in these countries. Many of their sculptured characters bear a strong resemblance to those of the Egyptians and Chaldeans. The characters on the rock here spoken of are similar in many respects to those of Yucatan. Doctor Le Plougeon, writing on the subject, states that the Mayas in Yucatan used many words and names common to all or nearly all the ancient languages of which we have any knowledge; that they used letters and characters belonging to the most ancient Chaldaic alphabet; and that their mode of writing was similar to that of the Babylonians. He even claims that the continent we live on was the cradle of the world's civilization. Other works of art also exist in this region which are equally as interesting as this sculptured rock.

About six miles from this spot, in a northerly direction, in the Calico range of mountains and two miles east of the town of Calico, an ancient tunnel has been driven into the hill through a granitic rock of a slaty structure for a distance of 180 feet. Some stoping has been done here and a shaft has been sunk at the mouth of the tunnel 30 feet in depth, the tunnel being 4½ feet high and 3 wide. The implements used in this work, judging from marks and abrasions on the rocky wall and roof, were stone hammers and gads of the same material. The mineral sought for was a peroxide of iron of a brilliant red color, which the people who performed this work undoubtedly used as a paint in decorating their persons and wares. Numerous well-formed stone mortars and pestles were found at the mouth of this tunnel, which was undoubtedly driven by the same race that recorded their history on this sculptured butte, but at a period anterior to the cataclysmic volcanic disturbance that destroyed both the flora and the fauna of this once fertile and populous land.

As a point of considerable interest, and one well worth noticing, it may be stated that Donnelly, in his "Atalantis, or the Sunken Continent," has for his frontispiece a character similar to that found on the Rattlesnake rock—a mythological symbol of something, but that is left for the archæologist to determine. The figure alluded to represents apparently the globe with a serpent or other huge reptile attached to or attacking it.

Borax Deposits.

On the southeasterly slope of Calico mountain there exists an extensive bed or measure consisting of several varieties of minerals, among others that known as Colemanite. This bed, which is situated seven miles in a northerly direction from the town of Daggett, lies between walls of slate which in turn are underlaid and overlaid by strata of sandstone—the diagram here introduced showing a cross-section of this deposit. This deposit is marked by smooth, well-defined walls—the underlay of the veins conforming to the irregularities of the footwall, while the overlying or hanging-wall is as smooth as the plastering on the sides of a hard-finished room. The color in some places is a pure white, in others a greenish or grayish color. At the point of development the strike is nearly east and west, dipping southerly into a spur of the mountain range at an angle of about 36 degrees. The slate and sandstone combined often attain a thickness of 80 feet. Above this formation is found a stratum of red sandstone, evidently indurated and discolored by heat. This is overlaid in turn by a brecciated eruptive material, evidently ejected from a water volcano. It contains angular fragments of a great variety of stone cemented into one solid mass by volcanic ash, lime and water. The boracic product contained in this vein or measure is crystalline and remarkably pure. Vuggs filled with clear prismatic crystals occur, often containing in their centers pure, tasteless crystalline water. The main workings are located on the southerly and easterly slopes of the range and northerly slope of the spur. The vein takes a crescent shape as it follows the rim of the basin in which it occurs, similar to a bedded measure of coal. It measures on the cropping line 14,248 feet, with workings at intervals for this entire distance, with the exception of an intermediate space of 2178 feet, where the croppings are covered by debris and a volcanic brecciated cap. The property is owned and controlled by the Pacific Coast Borax Co., F. M. Smith president and J. W. S. Perry superintendent.

A cord drawn across the arc of the crescent (circle) would measure 11,880 feet.

Developments.

This vein-shaped measure has been well opened at many places on its line of croppings and systematically developed. The developments consist of costean pits, incline shafts, adit levels, etc., exposing immense quantities of the boracic product.

Here are seen large masses of pandermite of a snowy dazzling whiteness, then a Colemanite with its crystalline vitreous luster carrying prismatic crystals that sparkle in the sun like diamonds—showing all the hues of the solar spectrum.

The mine has been most extensively developed at a point near the center of the several locations, and consists of No. 1, No. 2 and No. 3 shafts—the deepest, No. 1, being 249 feet on the inclination of the lode. At this point, water makes its appearance. The main workings are west from shaft No. 3, from which stopes have been extended for 52 feet east. The vein has been stoped from the 211-foot level to the surface. Below this point for 38 feet no stoping has been done. The bottom of the shaft is in good ore, showing a 6-foot vein. Only 12 tons per day are raised from the mine, which is sufficient to meet the requirements of the market. The supply is practically inexhaustible. The mine is well handled by Foreman Perry.

The workings are thoroughly ventilated by longitudinal drifts and winzes connecting the three shafts which are 100 feet apart. The ore breaks easily and it requires but very few hands to supply the demand.

At a point 400 feet westerly from the workings described, the vein has been developed by an incline shaft at an angle of 45 degrees to a depth of 45 feet. Here the vein shows the same general characteristics as in shaft No. 1, in richness, structure, strength, strike, etc. At this point a singular phenomenon presents itself. Immediately across a dry ravine 110 feet distant northerly at a right angle, a vein occurs with a reverse dip of 45 degrees pitching northerly into the opposite hill as shown in the cross-section presented. It is difficult to account for this phenomenon, but it must have been caused either by a sinking of the earth's crust or the bedded measure when laid down must have conformed to the irregularities of the surface, which at that time was all submerged and covered by saline water; or if laid down horizontally, a local upheaval must have occurred at this point, causing a folding of the strata.

The crude boracic product is hauled to Daggett by a 14-mule team carrying from 10 to 12 tons to the load, making usually two trips in three days. The product is shipped to San Francisco by rail and refined at the company's refinery in Alameda.

In my next article I shall have something to say of the Comstock of the South (Calico mountain) and its immense belts of argentiferous ore. Calico mountain is like a sponge that has been thoroughly soaked with water. A large portion of the northerly slope of the range has been so thoroughly mixed with a solution of silver that it is extremely difficult to select any portion that by assay would not show a trace of that metal. That portion of the metalliferous rock that lies in bands, belts and veins, will in the future prove largely remunerative to the mine-owner. It is a well-known and understood fact that Calico has been self-supporting from the start. She has neither asked nor received capital from the outside world, and has made many men moderately rich. The ground was at first believed to contain a system of blanket deposits; then by some of our scientists the defined veins were dubbed cracks in the earth's crust; but continued working and deeper explorations have demonstrated that both vein and ore have been continuous in depth as well as longitudinal extent.

(*To be Continued.*)

ANOTHER COMET.—Tona, at Palermo, discovered a bright comet on the 15th instant.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

French Gulch, Shasta County.

The Gladstone Mine and Mill.

EDITORS PRESS:— Having recently visited and mill by the very efficient superintendent, the property of the Gladstone Co., located north of French Gulch, I was shown through the mine Capt. Clark, who has had much experience as a mining man both in this country and in Sonora, Mexico.

This company, which has recently purchased here 11 mining claims, the Gladstone being one of the number, has since proceeded to equip the same with a first-class plant, consisting of a 20-stamp mill with shops, boarding-houses, etc., especial care having been taken to provide for the health, convenience and comfort of the workmen. The mill, which carries 20 stamps and is very complete in all its appointments, is now about finished and ready to start up.

It was at first intended that it should carry but ten stamps, but the improvement shown in the mine as developments progressed, determined the company to put in 20 stamps at the start. It is to be run by water-power, the water being brought in through a flume several thousand feet in length, and delivered under a pressure of 282 feet.

The mill, mine, and all the buildings connected therewith are to be lighted with electricity. The dynamo to be placed in the mill will also be run by water-power. The mine at present is being worked through the Gladstone and Helena tunnels. The Gladstone, which is the only tunnel of any great length yet run, is about 1000 feet in length. The Helena tunnel, about 200 feet farther up the mountain, is in 200 feet, showing at the breast a body of ore 14 feet wide and averaging $20 per ton. The Ohio tunnel, located on a lower level, is to be driven into the mountain some 800 feet, where it will tap the ledge at a depth of nearly 500 feet. This will be the main working level. While this mine has been called a low-grade one, some of the ore found here is so rich that it will be sacked and taken to the mill. There are at present about 100 men employed in and about the mine. The lumber used is hauled from Redding, and it will take several hundred thousand feet to finish the work.

It would be a good thing for investors if we had in the country a few more mines like the Gladstone, and it would be a good thing for the workmen if we had a few more mining superintendents like Capt. Clark to look after their comfort. B. F. B.

French Gulch, Shasta Co., Cal., Nov., 1890.

More About Tempering Drills.

EDITORS PRESS:—I do not know that any information I may impart as a practical blacksmith will be of benefit to Mr. S. H. Bryant of Tombstone, Arizona; but this much I will say: Having had years of experience, I believe that practical results are of more value to the practical mine-worker than any scientific knowledge "as to what may cause cracks in steel drills." I have worked during my lifetime thirty years at my profession, and at different periods have worked all brands of steel used for mining purposes. When a blacksmith sharpens three hundred drills and sometimes more, in a day, and the necessary amount of picks, gads, etc., if through hurry or carelessness of his helper a drill is burnt, the only way is to cut off the burnt portion.

My method of working cast steel drills is as follows: I use hot and cold water. Drills must be heated to an even heat to sharpen. I chill from the hammer, and as is the case often, the drill is heated two and sometimes three inches above the point. I immerse my drill in the cold water, so as to exclude the atmosphere from any portion that is heated, for eight or nine seconds, withdraw immediately, and drop it into the hot water (the hotter the better) and let it cool there. My reason for so doing is this: I do not believe in anything but a chill (hardened right out) for a rock drill; by immersing the drill so as to exclude the air, the shank portion is chilled only skin deep; by putting it in the hot water the point retains its chill as desired, while the shank from the heat in it comes down to its natural order. Practical mining blacksmiths will know my meaning. I venture to assert if such a method be adopted, few drills will break above the bit and cracks will be but seldom seen. I have sharpened Firth & Son's steel forty times without cracks of any kind, and our common American brands twenty times and sometimes more.

Believe me to be a reader of the PRESS and a lover of the information it contains.

JNO. DUNCAN SMITH.

Navajo Mine, Tuscarora, Nov. 17, 1890.

PUBLIC FRENCH OPINION ON THE LENGTH OF A WORKING DAY.—Among the 19,455 answers to the list of questions concerning the regulation of the working hours and of work generally which have so far been received by the French Commission, 4442 are against any and all regulation, 5012 are in favor of a working day of eight hours, and 9270 advocate as the number of hours to constitute a day's work 9, 10, 11 or 12; 731 answers are too vague to deserve notice.

As Others See Us.

Mr. E. Dickinson, Sheffield, England, who participated in the recent international meeting of engineers, stated, when interviewed on his return to England regarding his impressions from his journey, according to the *Iron and Coal Trade Review*, that the Americans consider that they are in every way in advance of the mother country, and, in fact, of all the countries in the world. "Their buildings and institutions are bigger and better than anywhere else; their works and manufactories are on a very large scale, and the output, owing to improved organization, is considerably more than would be secured by the same number of men and the same amount of plant in England."

As an instance, the works of Disston & Sons, at Tacony, where saws and files are manufactured, turn out an output in saws equal to the total output in Sheffield. Their products are all machine made.

Generally, machinery is more extensively used than in England. At Disston's works, Mr. Dickinson was struck with the machines for cutting and at the same time graduating the teeth of hand-saws. They were fed by lads, and the blades passed through as quickly as it was possible to handle them. The machines cut 1500 teeth per minute. The same firm also has a much more expeditious and improved method of "goffing" and tempering than Sheffield firms have. The furnaces used for this purpose are heated by gas and have a revolving center. He was very much interested in the manufacture, at Disston's, of circular saws with renewable and interchangeable teeth, an invention he termed "capital." In the warehouse mentioned, he observed packages of saws addressed to England, and also saw some hand-saws there 40 feet in length by 14 inches wide.

"The American manufacturers go more in for quantity and rapidity of output than quality; but they do not care to put work and high finish on parts of machinery that are not seen."

"In general tools they have not anything like the same number of patterns, consequently in slack times they can make immense stocks, and know exactly how long it will take to dispose of them."

The American products he did not find superior to the English, and in many cases decidedly inferior. "But the Americans are much more inventive than other nations, and their patents much more valuable."

Mr. George Siddell, Sheffield, was greatly impressed by the abundance of our resources, the rapidity of our industrial development, the enterprising spirit, industry and application of our people. Greatness, he thinks, is equally characteristic of the manufactures here and of the physical resources of the continent. Everything he found to be on an extensive scale, except guns and ships; and the fact that the Government has bought up the nickel mines he interpreted as significant of its intention of making armor-plates on a very different scale from anything as yet attempted. The American manufacturers never stint expenditure as to plant and machinery; and labor-saving appliances in the iron and steel works, and especially in the rail and plate mills, cut manual labor down to a mere cipher. Therefore he believed that but for the tariff the American manufacturers would be able to compete with the English in any market.

As to the output of the American works, he admitted its greatness, but thought that in England the Consett Iron Company turns out about four times as much as the largest American works. Whereas, Carnegie's output is about 4000 tons a month, the Consett Iron Company produces about the same quantity every week. Carnegie's place is magnificent. The arrangement of the melting furnaces, both there and at some of the other places, is splendid. There is nothing in England that comes up to it. Some of the melting furnaces have a capacity of 35 tons, and there are hardly any in England greater than 30 tons. They have many circular furnaces, too, which are not seen in England, but he did not know that there is any great advantage in that mode of construction. At Chicago they roll direct from the ingot, without reheating, which is also done in some English works, but Carnegie's method of rolling from the bloom he considers by far the safer plan.

Asked as to the comparative capabilities of English and American works, Mr. Siddell admitted the superiority of the American rail-mills, but as to large forgings they do nothing beyond ten tons, "whereas the English works can run up to any weight that there is a call for." He qualified, however, these statements by remarking that he had not inspected the Bethlehem Works, where the Government orders are executed for gun forgings and the like. "There is a splendid opportunity," Mr. Siddell added, "for energetic Englishmen to go out there in the heavy trade. They might make a fortune in a very short time, because there is no heavy work done there yet. They are just commencing with the guns, and any one well up in gun forging could command his own price."

Both gentlemen were full of admiration for the American workingmen as steadier, more intelligent and quicker than the English operatives. They work harder and longer hours. Mr. Dickinson's belief that the American workman who receives £3 a week is not better off than the Englishman who only gets £2, owing to the smaller purchasing power of money in America, is hardly compatible with his utterance that the American workingmen "struck him as being well dressed and having very comfortable homes; and a higher social tone prevails among the artisans there than in many of our industrial centers."

That America is far ahead of Europe in the number and variety and efficiency of electrical appliances, was acknowledged as an undisputed fact.

Mr. Dickinson ventured the opinion that English firms transferred to American soil might be highly successful if they had enough enterprise and energy. Another statement of Mr. Dickinson to the effect that "Americans admit that in cutlery they cannot approach the English for quality; that the well-to-do Americans invariably have English cutlery for their own use; and that you cannot pay an American a greater compliment than to give him a really good Sheffield knife," needs no comment to be appreciated.—*Engineering and Mining Journal.*

Gold Mining in South Africa.

A report issued by the Witwatersrand Chamber of Mines gives a fair idea of the actual condition of affairs existing in that portion of South Africa, at least it gives a fair idea to those who have watched the boom, growth, development, decline, revival and final adjustment of affairs upon a business basis of profit and loss. The history of mining regions is but a repetition of one story.

The report states that the value of the gross production last year was, in round numbers, $6,950,000. The mining industry of Johannesburg is the only value-producing industry there, so it must have paid for all expenditures there which the outside world did not pay for.

The expenditures are placed at $9,000,000 paid for freight on supplies, while the value of the supplies is not given. Taxation and royalties on mines amounted to $4,410,975, and wages to $1,160,000. How much of the wages, royalties and taxes entered into the freight or transportation account cannot be told. Possibly all of it did. Leaving out these items, as well as the cost price of all supplies, and considering only the freights paid, we find that $6,950,000 of gold cost $9,800,000. The condition of affairs there is much like what it was in the Rocky Mountain region when all supplies were hauled from the Missouri river, and when the freight rates were from 5 to 25 cents a pound and the freights alone exceeded threefold the value of all the gold produced in the mountains. There are, too, other features common to Africa now and this region when it was very new, 25 years ago. Dance-houses, hurdy-gurdys, gambling, and all their accompanying lawlessness characteristic of new mining regions, have been holding high carnival at Witwatersrand, as they once did here.

But what can be thought of mining in a region where, out of a total production of $6,050,000, the sum of $4,410,975, or over 60 cents on a dollar, must be paid to the Government as taxes and royalties?

Death Rate in Different Industries in England.

According to an English exchange, the annual death rate per 1000 employed is as follows:

	Age 25 to 45 y'rs.	Age 45 to 65 y'rs.
Average for the whole country	10.16	25.27
Minimum	4.64	15.93
Maximum	22 63	55.30
Coal miners	7.63	25.11
Iron ore miners	8.05	21.85
Tin miners (Cornwall)	14.77	52.69
Cutlery makers	11.70	34.42
Boiler-makers	9.27	26.65
In iron and steel works	8.36	22.85
Average for metal-workers	8.80	25.03

It appears, therefore, that coal mining, instead of being an "extra hazardous" occupation, is in reality one of the safest.

RESPONSIBILITY OF EMPLOYER FOR SAFE APPLIANCES.—A mining company which employs a superintendent to hire and discharge the men and furnish them with supplies is responsible for his negligence, and notice to him is notice to the company. Where a company undertakes to supply its miners with fuse, it is charged with the duty of furnishing good fuse, and where notice is given to the superintendent that fuse supplied to a miner is bad, and he tells him to do the best he can with what he has until more can be secured, the company is responsible in damages for injuries sustained by the miner if he is injured while using the defective fuse with the degree of care which its condition would impose upon a prudent man.

THE FIRST SIAMESE RAILWAY.—In our Indian mail we find that a German company has got the contract for the first Siamese railway. The line will be 165 miles long from Bangkok to Korah. German rails and machinery will be used, and German engineers will be mostly appointed. Mr. Bethze, in charge of the work, promises to lay the line down for one million sterling.

A BERLIN statistician reports that the number of suicides in the various countries of Europe, including England, was 85 per cent greater between 1880 and 1890 than during the preceding decade.

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San Bernardino County.

Its Mineral and Other Resources.

NUMBER XXII.

[Written for the PRESS by JAMES H. CROSSMAN.]

Mineral Belts.

It is a well-understood and acknowledged fact that metalliferous veins in all important mineral-bearing countries occur in belts or zones of considerable longitudinal extent and of variable widths. These belts are usually found in triplets, and as a rule lie parallel with each other. Situated within their exterior boundaries and adjoining one of the contacts, a so-called mother vein—it being of mammoth proportions—occurs. The gangue is either siliceous or calcareous or a combination of both minerals—it being invariably metalliferous. From this main lode radiate branches, spurs, feeders and stringers that draw their metalliferous contents from the belt proper. To use a simile, the belt is the metalliferous water-shed that supplies the tributaries which flow into the main artery. The formation compares to a tree—the mother-lode being the trunk and the spurs and feeders the branches.

Notable instances of this law of nature are found in the Veta Madre of Mexico with its parallel metalliferous belts—the so called mother lode of California with its three or more parallel belts comprising the copper-bearing zone on the west. The first east consists of the belt that forms the metalliferous domain of West Point, in Calaveras county, traceable northerly and southerly for a long distance. The next east and parallel we find the belt in which the Sierra Buttes, Plumas-Eureka and other prominent mines are situated. The Comstock of Nevada is traceable for a long distance with the two or more parallel mineral belts or zones.

San Bernardino county is no exception to this rule. She has within her boundary lines at least three important mineral belts which we will describe later. It is this fact that enables the mining prospector to successfully prosecute his work of discovery. Regardless of formation or debris-covered valleys, his compass his guide, he takes his bearings and starts for an objective point, and he seldom misses finding, in the first mountain peak that rises above the level of the plains, metallic float, either in the ravine or on the sidehills of the range. He traces the float to its source. If the lode does not crop, he sinks his shaft and finds it.

In Article 21 of this series it is stated that the next number would contain a description of Calico and its mines; but after a recent and more careful examination I have decided that the complex nature of the mineral-bearing zone in which the prominent mines of that locality occur, requires a more thorough investigation and careful study before entering upon its description. The vein occurrence, however, in the vicinity of Calico has been governed by the same general laws—Calico being no exception to the rule; but as volcanic action and its resultant effects have been more violent and decided at this point than at any other in San Bernardino county, the phenomena require an especially careful examination. I will therefore for the present continue my general description of the belt in which the metalliferous veins of Calico mountain occur.

The belt proper has a longitudinal extent of at least 140 miles. Its strike is north 65 east and south 65 west. It is of variable width, expanding and contracting. At its narrowest point it is one mile wide and at its greatest expansion eight miles wide—disappearing where covered by soil and debris of the valley lands, but invariably appearing in all elevated peaks and mountain ranges on its line of strike. Its mineralogical features are strongly marked and easily recognized from the surrounding strata by the metamorphic condition of its rocky structure, as well as by discoloration caused by metallic oxides that stain the surface of the mineral-bearing veins which occur on the belt. The Iron Hat, so well known to the mining prospector, is a sure indication that it is only the cap of a metalliferous vein containing either lead or silver. A blue-green or red stain indicates copper—its carbonates and oxides appearing on the surface.

During the periods of volcanic activity that at no remote period, geologically speaking, convulsed the whole western portion of the American continent from pole to pole, powerful gases and thermal waters, surcharged with both mineral and metallic substances, have found vent at the earth's crust, through either previously or contemporaneously formed fissures—their sources resting in deep-seated centers. These volatile gases and aqueous products, on meeting with reagents in their upward passage, deposited by precipitation their burden—the latter silica and lime in the form of a paste which rapidly crystallized, filling the fissure vents with quartz and spar of their several varieties of siliceous and calcareous compounds. This formed the gangue of the vein, which in turn was impregnated with metallic compounds by the same common carriers, gas and steam, augmented at a later date by electrical action concentrating and depositing the precious and baser metals from the surrounding rocks both in and on the vein plate of Nature's electric battery. This process is in constant and never-ceasing operation.

In our description of this important mineral belt we will commence at its southwesterly extremity, where the low hills and mountain ranges emerge from the Mojave desert. At this point its mineral character is first noticed. It shows a width of six miles, by a longitudinal extent of 12 miles—in several places covered by the debris of the valley lands, but plainly marked and distinguishable at all elevated points. It is here that we find the several mining camps of West, Central, North and Galena—each situated on elevated points above the plains (for particulars, see Article 17 of this series); thence northeasterly, following the course of the belt over a debris-covered plain for a distance of 24 miles, we enter the boundaries of the Grapevine Mining District, which contains the southwesterly extremity of the Calico mountain range. At this point, we having entered the confines of the Plutonic realms, evidences of volcanic activity are seen on every side. To the unpracticed eye of the casual observer, the rocky structure has been plicated, crumpled, faulted and thrown into every conceivable shape and to all appearance into inextricable confusion; but to the practiced eye of the observer and geological student who has graduated in the field, order from chaos can be restored. Both the exterior walls of the belt are in place and discernible. The underlying or footwall still carries the mother lode; the northerly wall is intact. The intervening space, though much disturbed and with long lines of volcanic debris and ash, shows marked and well-defined veins of spar and quartz rich in the precious metals, which will be particularly described under their appropriate head. This portion of the belt from the Central to the Emma, Waterman and Calico mines is traceable and continuous on its line of strike for a distance of more than 18 miles, with the exception of about 3½ miles of intervening debris-filled valley lands (see Article 5); thence on our course for 12 miles over a desert country, we reach the southwesterly flanks of the Alvord range (for description see Article 19). This mountain has a longitudinal extent of 15 miles. Thence, crossing a desert of 20 miles, we reach the range that contains the Solo Mining District, northerly from Soda lake (see Article 19 for description of this district and its mines). At this point the belt has a width of six and a length of three miles; thence, over a desert country for 24 miles, a low range appears above the plain which contains a group of silver and lead bearing mines known as the Rell discovery. The ores are of low grade but abundant, with no development of importance. The formation is similar in every respect to the Calico range and continues for a distance of three miles, thence crossing a desert to the westerly flank of Clark Mountain and Mining District, of which the town of Ivanpah forms the distributing point for the surrounding country. This range is nine miles long. Its formation is largely calcareous, containing powerful dykes of porphyry and trap. The veins form in groups each independent of the other, and as a whole are comprised within the boundary line of the

Clark Mining District,

Which covers an area of about 600 square miles. This district is situated in the northeastern portion of San Bernardino county, the oldest organized mining district in the county, and in which the first silver bullion was produced. A frontiersman and well-known prospector by the name of Johnny Moss was the discoverer in 1868, through the assistance of a Piute chief, who brought him a piece of metallic copper which he had found in the vicinity. Johnny investigated and discovered its source, took samples, went to San Francisco and organized a company to develop the mine. The writer accompanied the outfit as mining expert for the company to determine its value. The party outfitted from Visalia. A Mr. Clark, one of the company, accompanied the expedition. At that time the Indian tribes of the desert were hostile, killing travelers and committing depredations in every direction; but Johnny was equal to the emergency. He formed a treaty of peace with the Piute tribe and was permitted to travel over their territory unmolested, drink water from their springs, kill their rabbits and mountain sheep, and work their mines. This treaty was kept in good faith by these nomads of the desert until news was brought by one of Moss's Indians that three German prospectors had been killed in the Arawatz mountains. Johnny, who had been previously elected as an honorary chief of the tribe, sent out his runners and built signal fires on prominent peaks, calling the Indians together for a powwow. The tribe assembled. A "big eat" was first in order; after that the traditional pipe of peace was smoked, and Johnny addressed them in the language of their tribe, asking them why they had broken their pledges by killing the prospectors. A consultation was held by the chief and medicine-man of the tribe, and they denied the allegation, claiming that Dutchmen were not white men and that they had not broken their treaty. After that, the Teutonic race was included in the treaty and peace reigned in the desert. On Moss's adoption by the tribe he was given the name of Narreguinip (never die). He died all the same, but the Indians still claim that he has crossed the big waters on a visit and will soon return.

(*To be Continued.*)

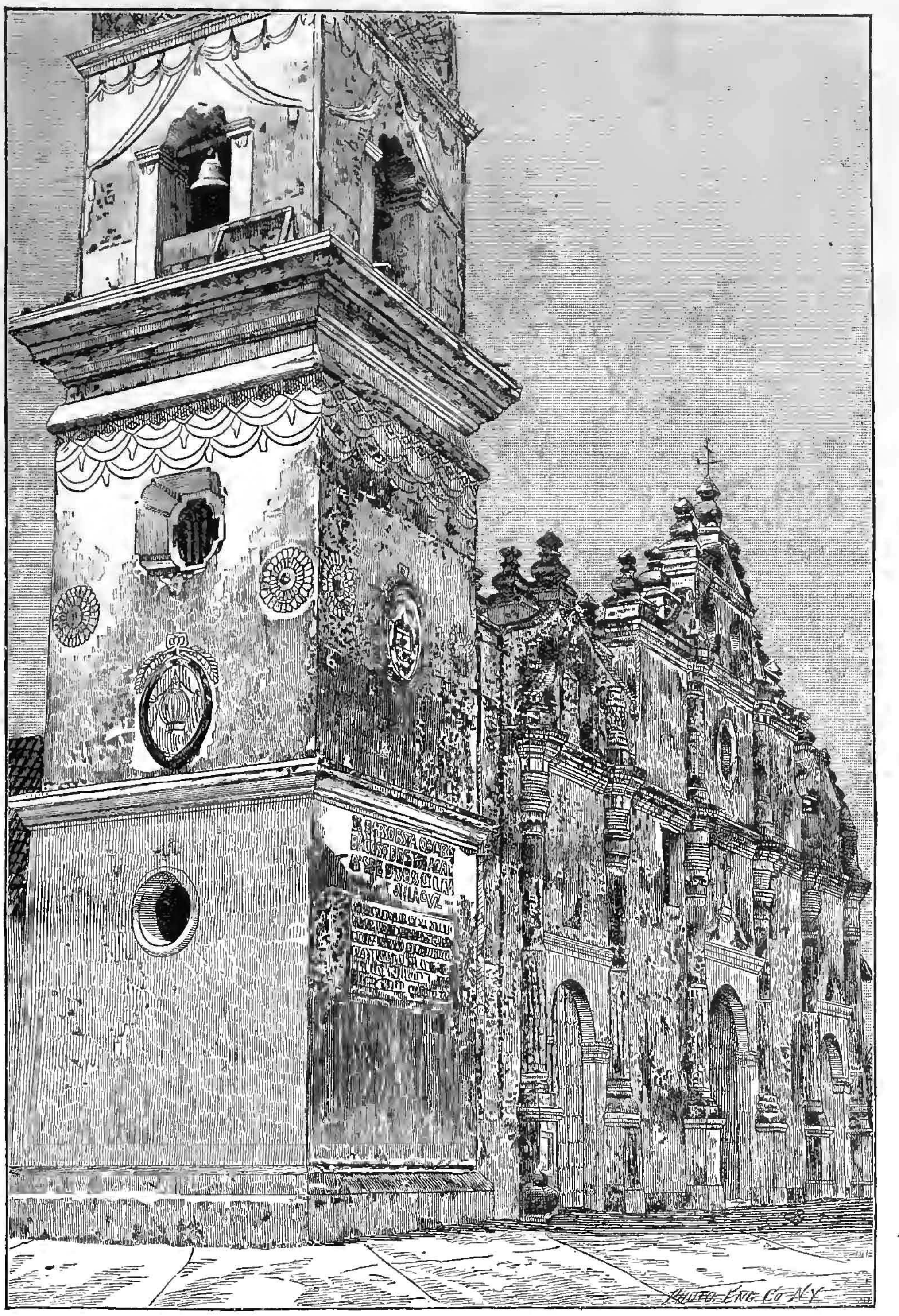
PHOTO-ENG-CO-N.Y.

CHURCH OF LA MERCED, GRANADA, NICARAGUA.

An Old Church at Granada.

We illustrate on this page a very interesting structure of great age, the cathedral at Granada, a city of Nicaragua, a country which will come into growing importance in the world's eye as the Nicaragua Inter-oceanic canal progresses nearer to realization.

Granada is a city lying on the western shore of Lake Nicaragua. The towns near the lake, of which Granada and Rivas are the chief, might under happier auspices have become great centers of population; but years of anarchy and internecine strife, together with the jealousy of rival cities—Leon and Managua for example—have produced more of ruin than time itself. Many a follower of Walker could tell stirring tales illustrated by the battered walls, wrecked churches and "places stormed at with shot and shell" in Granada and Rivas. There has always been a certain jealousy between the Nicaraguan cities as to the right to be considered the capital of the State. Even to-day it is not a safe issue for a stranger to raise. In the total population of 400,000 the ancient and aristocratic city of Leon comes first with 30,000 inhabitants. Massaya comes next with 14,000, of whom, however, a large number are Indians. Then there is Granada with 12,000, and Managua, the generally reputed capital, with 10,000. Rivas, the ancient capital, has dwindled down to fifth place with 8000, but as the proposed canal will pass quite close to it, the prospects for its restoration to supremacy are exceedingly good.

Nicaragua is essentially a land of antiquities. The splendid churches and cathedrals built by the Spaniards have architectural charms and ruined glories of their own. The great cathedral of San Pedro of Leon is probably the finest religious edifice south of the City of Mexico. It was finished in 1743, at a cost of $5,000,000, occupying 37 years in construction. It is of cut stone and is one firm mass of masonry, covers an entire square, and its front extends across one side of the Grand Plaza. Like similar buildings whose ruined arches and walls may be seen in Antigua de Guatemala, this church has walls at least 15 feet in thickness, and has the solidity of a rock. Numerous earthquakes have produced no impression, and the storms of a century and a half have in no way injured its fine quality of stone. In numerous disputes between Leon and Granada, the church had often been converted into a fortress, and sustained a few bombardments from besieging forces. Thirty pieces of artillery are said to have been planted on its roof at one time and on its eastern side there are many indentations made by shot. This cathedral was once possessed of great wealth, the chancel was surrounded with a railing of solid silver, while all the altar ornaments were of gold. With the exception of the cup and plate used at mass, the church has no ornaments of precious metals now. Much was shipped to Spain, and what remained did not escape the rapacity of the soldiers, who have many times advanced and retreated through Leon.

The church shown in the engraving on this page is quite different in some respects from that at Leon to which reference has been made. It is the church of La Merced. It is ancient, massive, and in a good state of preservation considering the vicissitudes through which it has passed.

Black Hawk Mining Company.—This company, composed of English capitalists, operating in the San Bernardino mountains, 40 miles east of Victor, has suspended operations, it is said, on account of low-grade rock. This company has expended a large sum of money in a hydraulic placer-mining scheme at Holcomb Valley. It seemed to possess abundance of means and no little amount of enterprise. In addition to the above work, it has bonded numerous prospects and purchased a number of tracts of land. At present it is engaged in developing its hydraulic mines on Lynx creek, near Prescott, A. T. At this point it is building an expensive flume ditch and dam. It is proposed to utilize the water after it has passed beyond the mining works in irrigating a large tract of land in Lonesome valley, recently acquired by Mr. Peddley, the superintendent of the company.

The German Government and the Miners. It is officially announced that all, or nearly all, the demands which were recently submitted to the German Government by the miners' delegates have been conceded. The principal points are that shifts last eight hours only, that all the miners who were dismissed after the recent strikes shall be reinstated, and that provision shall be made in the Labor Amendment bill, now before the Reichstag, for the creation of arbitration courts. The mining officials are also to come under the jurisdiction of the court of discipline, and they are to be punished for ill-treating miners. "Farming" certain jobs is also to be abolished.

The cooper mines at Varshire, in the eastern part of Vermont, have been pumped dry and large gangs of miners are working in them night and day. To light the mines and the smelter, an electric-light plant has been put in. The houses have been repaired and painted, and are now filled with workingmen and their families. The opening of the mines has made a good market for the farmers, and the abandoned farms will be wanted. The mines formerly employed 300 men.

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San Bernardino County.

Its Mineral and Other Resources.

NUMBER XXIII.

[Written for the Press by James H. Crossman.]

Clark Mining District—Continued.

In this district both wood and water are sufficiently abundant for all practical purposes—the wood mesquite and nut pine; the water flowing from living springs. The strike of the vein is northwest and southeast, dipping northeasterly at an angle of 45 degrees. The footwall is usually a dolomitic limestone and the hanging-wall a calcareous shale. The veins are evidently true fissures and go to the deep. The largest and most prominent group is situated at an altitude of 5600 feet above the level of the sea and from four to five miles in a northwesterly direction from the town of Ivanpah. This group contains the following veins, viz: The Monitor and the Beatrice No. 1 and No. 2, owned by Julius Jacobs of San Francisco. These veins were discovered in the spring of 1870 and have been regular bullion-producers ever since. The ores treated have been worked in a five-stamp mill. The veins, though small, have yielded since their discovery bullion to the value of about $2,500,000. The greatest depth attained is 250 feet, with a longitudinal extent of 1200 feet. These mines have been self-sustaining from the start and are at this time in bonanza.

The Lizzie Bullock is a southeasterly extension of the Monitor; the vein is from a mere seam to four feet in thickness, ore values from 150 to 2000 ounces per ton; coin values extracted about $1,200,000. It is developed by a shaft 400 feet deep and two tunnels—one 250 feet and the other 845 feet long. The mine has been worked steadily since its discovery in 1870. The Alley mine, which adjoins the Lizzie Bullock on the north, has also been a large producer. It is developed by a tunnel 400 feet long which gives 100 feet of backs. The assay value of the ores varies from 300 to 4400 ounces per ton; $100,000 have been paid in dividends. The ores work in the free way up to 95 per cent of their assay value. This mine has paid larger proportionate dividends to the amount expended than any other in the district. The two last-named mines, and a 10-stamp-mill in which the ores have been worked, belong to J. A. Bidwell.

The Eugenia has been opened by a tunnel 100 feet in length; ores rich but spotted.

The Snowstorm is situated half a mile north of the Beatrice and on the contact ledge; prominent croppings between incasing walls six feet; gangue free-milling quartz averaging $300 per ton. But little work has been done on this vein, and none for a number of years past.

The Stonewall mine of the same group and date of discovery, is an easterly extension of the Alley, its ore being of the same character and values. This mine has been developed by a tunnel 300 feet in length giving backs of 250 feet on the vein, which is 12 inches thick. This mine has also been profitably worked since its discovery.

The Alps lies east of the Stonewall and is a dividend-payer.

The Copper World lies on the southerly flank of Clark mountain at an elevation of 5000 feet above sea level. Croppings extensive, showing evidence of a large deposit. Ores oxides and sulphides, with some metallic copper. It is developed by two shafts of 50 feet each and two tunnels—one 75 and the other 15 feet long. Ore varies from 20 to 82 per cent copper. A number of shipments was made to San Francisco in 1869 of 75 per cent copper. Vein about 50 feet, lying between walls of lime and porphyry.

Mescal Mining District.

This district is situated six miles south of Ivanpah. It was discovered in 1885. Work of development by McFarlan and Barrett.

At the Cambria mine, the gangue is quartz inclosed in dolomitic limestone; course southwesterly and northeasterly; dip 30 degrees east; assay values, silver 50 ounces and gold $5 per ton. In 1886, parties in Los Angeles purchased the property and erected a 10-stamp mill. Since that time the mine, though possessing intrinsic merit, has been worked with but little energy. Preparations are now being made, however, to work it in a more energetic way.

Bullion District

Lies seven miles southeast of Nantan. It contains a number of promising veins carrying ores of both silver and gold. But little work has as yet been done here.

New York District

Is situated in the northeastern portion of San Bernardino county and about 20 miles east of Clark mountain. It is one of the oldest mining districts in the county and has attracted considerable attention—the mountain in which the district is located being a marked feature in the landscape.

Shortly after the excitement that followed the discovery of the Comstock lode, the whole country west of the Rocky mountains swarmed with prospectors in search of its counterpart. At that time impecunious frontiersmen and prospectors could easily obtain costly prospecting outfits from prosperous traders and merchants for a share in their discoveries and locations—it being considered a good investment. The desert region of San Bernardino county was, with other localities, visited by these adventurers. New York mountain presented an attractive field, as it bore the earmarks of mineral wealth. Its mountain slopes were covered with nut pine and cedar. Strong evidences of the existence of water in the range were visible. In 1861, a party of prospectors who had been ranging eastward from Death valley entered this mountain by a broad ravine that took its rise in the summit and debouched into the valley. The alluvions that formed the bed of this ravine showed evidences of mineral stain, which increased as the party advanced—the ravine finally contracting and forming a box canyon. The erosive action of the water had cut a deep gorge by the side of a mammoth ledge of quartz that formed the westerly bank, which had a vertical hight of about 35 feet—the formation being mineral-stained with the colors of green, blue and red. Silver was also seen spotting the rocks as chlorides and sulphides. The prospectors were sure that they had discovered another Comstock. They followed the bed of the canyon to a point where it had bisected the lode, when was seen on the opposite side, near this point, a strong spring of pure water flowing from a crevice on the west bank. The party came to camp, unloaded their jacks, cooked and ate their frugal repast, spread their blankets, and slept the sleep of the just, dreaming of marble palaces with silver walls and golden pavements. In the morning, both mines and water were located, and in 1862 a small mill was put up for working the ores.

Not long after, the Indians burned the mill and killed the men, causing the camp to be abandoned. Troops were sent from Mojave Station, but the Indians had already made good their escape. The mine lay idle till 1873, when it was sold to Messrs. Winchester & Co. of Elgin, Ill., who opened it and built a mill containing a Whelply-Storer pulverizer and two pans. The ore proving rebellious, the mill was closed down and has remained idle since.

The veins here crop boldly to a hight of from 10 to 40 feet and hold for considerable distances on their line of strike. They are well mineralized, show every evidence of value, and range from six to eight feet in width. They occur in a quartzose gangue, the ores being argentiferous and carrying the bases of copper, lead and silver; assay values from 40 to 100 ounces per ton. The core of the mountain ranges here is syenitic, flanked by lime and porphyry, the veins usually occurring on the contact.

The Gladiator, one of the most prominent veins of the district, crops boldly for a distance of three miles with a N. W. and S. E. strike. This mine has been developed to a vertical depth of 300 feet, showing a well-defined ledge carrying smooth and perfect walls standing nearly vertical. The ore is reported to have averaged 100 ounces per ton.

The Highlander is a companion vein lying in the vicinity of the Gladiator, carrying ores of the same general character—free where oxidized above the water level and base as soon as water is reached. To successfully treat these ores, dry crushing and chloridizing furnaces are necessary.

The Belfast lode adjoining and running parallel with the Highlander, carries a large body of base ore, being contaminated with antimony, arsenic and sulphur. The most of this ore is low grade.

The Texan is a well-defined and strong vein, but carries a low-grade ore. It could probably be worked with profit if fuel could be cheaply obtained and a plant could be had sufficiently large to handle it in quantity.

The Montezuma is a strong vein, carrying an abundance of ore rich in silver, galena and carbonates of lead. Though but little developed, the camp possesses every facility for economical workings—wood (nut pine and juniper) being abundant, with water sufficient for all practical purposes. The water level is reached at a depth of from 300 to 400 feet. Elevation 5000 feet above tidewater; distance from A. & P. R. R., 30 miles, over a natural highway of easy grade.

(*To be Continued.*)

In Nicaragua.

The course of events apparently justifies anticipations of the realization of the interoceanic canal enterprise via Lake Nicaragua. In his message to Congress the President says: "The Nicaragua canal project, under the control of our citizens, is making most encouraging progress, all the preliminary conditions and initial operations having been completed within the specified time."

The progress of the enterprise adds new interest to scenes representing the locality through which the canal will pass and the life of the citizens of the country which will thus become commercially one of our nearest neighbors. Having on former occasions, when speaking of this country, produced in the Press cuts illustrating the scenery along the route of this great interoceanic water-way, we present herewith an interior view of one of the better class of Nicaragua dwellings, the equipment of which, as will be seen, does not differ widely from that found in most of our northern homes.

But, besides a certain tropical air about the apartment and its outfit, there will be observed suspended across it the ever-present hammock, found in all warm countries, more especially in those inhabited by peoples of Spanish origin. This style of couch, which corresponds in its uses, at least, to our easy-chair or lounge, is in these countries seen everywhere—in the mansions of the rich and the huts of the peons alike, it being in these hanging and gently swaying beds that all take their siesta or mid-day sleep. More often they are suspended in the veranda than in the interior of the dwelling, as shown in the cut. These hammocks, woven from strong cords, are often very tasty affairs, being dyed with many bright colors and adorned with fringes, tassels and the like.

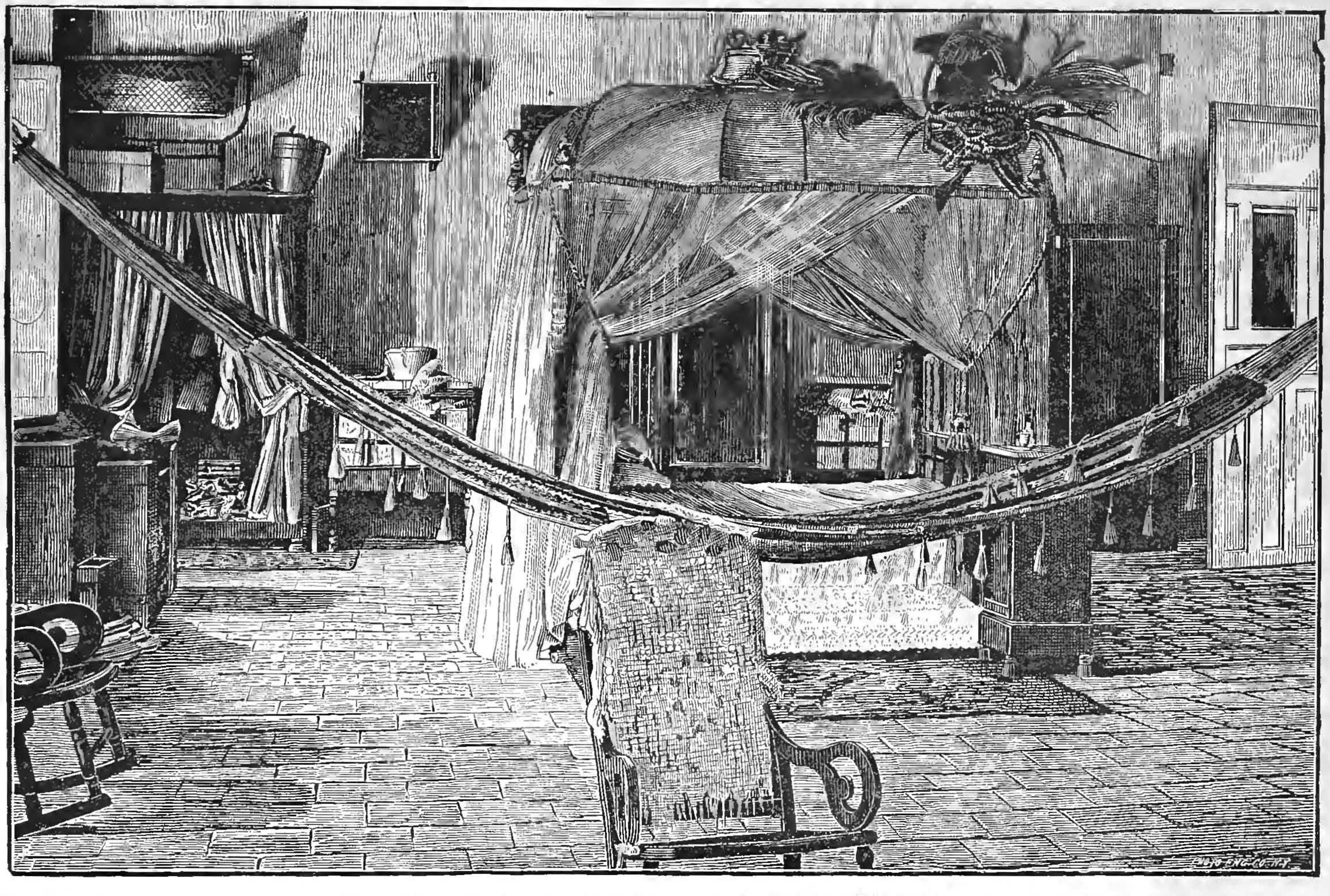
PHOTO-ENG. CO. N.Y.

IN NICARAGUA—AN INTERIOR IN A NICARAGUAN RESIDENCE.

The New Alloy discovered by Keith of Backenheim, Germany, is claimed to practically resist the attacks of most acids and alkaline solutions, and may therefore be very advantageously used in the laboratory to replace vessels of ebonite, vulcanite or porcelain. It is composed of 15 parts copper, 2.34 parts tin, 1.82 parts lead and one part antimony.

San Bernardino County.

Its Mineral and Other Resources.

NUMBER XXIV.

[Written for the PRESS by JAMES H. CROSSMAN.]

Providence Mining District,

Situated on Providence Mountain, has been subdivided, and is now known respectively as the Trojan, the Gold Belt and the Arrow Mining Districts.

Providence Mountain has been previously described in article No. 5 of this series. That portion of the range known as Providence Mountain contains a longitudinal extent of about 20 miles, and is composed of many varieties of rock. The hanging-wall of the mineral belt which courses N. 25 degrees east, through the easterly flanks of the main range, is a porphyritic granite. This mineralized belt is traceable for a distance of more than four miles, and contains 17 full locations of mining claims, with 12 others that are not on the belt proper, according to the District Recorder's book of records.

The Trojan District

Is the most important of the three. The Bonanza King's Mill & Mining Company's property consists of the Bonanza King, Bonanza King North, Orient and the Rattler. Its history in brief is as follows: In 1880 two prospectors from Ivanpah discovered the Bonanza King, and sold it to the noted mine operators and capitalists, Messrs. Osborne and Drew, who opened the mine, proved its value, and in 1882 resold it to San Francisco and New York capitalists for the sum of $200,000. Systematic work of development was commenced and a 10-stamp mill erected. From date of purchase to date of suspension in 1886, on account of the burning of the mill, the mine was in bonanza, having paid in dividends a sum in excess of $200,000. Notwithstanding the large amount of ore in sight in the mine at that date, the owners decided, on account of the low price of silver then ruling, not to rebuild the mill, and their mine has lain idle since.

The developments in the Bonanza King proper consist of a main working shaft, 650 feet deep (vertical), with a network of drifts and crosscuts exposing large bodies of high-grade ore. The Orient and the Bonanza King North adjoin and have been developed and worked through the Bonanza King's main shaft. The buildings and surface improvements are on the Orient ground.

The old Cashier lies on the southerly extremity of the belt referred to. It is a well-defined vein showing spots of silver copper glance that assays from 100 to 400 ounces per ton. It is developed by two small shafts; the owner is L. Walcott.

The Trojan Mine

Contains surface deposits of low-grade ore in the form of segregated pockets or bunches varying from 1 to 50 tons each; ore values in silver, 40 ounces per ton. Notwithstanding the low grade of the ore and low price of silver, this mine has been profitably worked to a considerable extent. The owners are Turner & Dwyre.

The Mineral Paint Mine

Has been developed by two levels which have each been extended into the mountain for a distance of 300 feet. The ore extracted has been assorted by hand picking and the better class shipped to Kingman and Ivanpah for sale and reduction. Ore values are from 150 to 500 ounces silver per ton. The second class is worth from 40 to 50 ounces per ton, which still remains on the dump; owners, J. B. Cook and others.

The Mozart

Has been developed by two short tunnels and two shafts, 50 and 90 feet respectively. The ore that has been 'stoped from the mine has been shipped to Kingman and yielded 150 ounces silver per ton. The owners are J. B. Cook and others.

The Lucknow has been developed by an adit level 200 feet long, driven across the country rock into the lode; ore values 40 ounces per ton; the mine is owned by J. B. Cook and others.

The Red Leg has a shaft 40 feet deep on a 20-inch vein; assays run from 15 to 300 ounces per ton; owners, Gorman & Dwyre.

The Bell McGilvray mine is developed by a shaft 75 feet deep and one of 50 feet; also two tunnels respectively 150 and 300 feet in length. Of the ore extracted, 100 tons milled yielded 125 ounces silver per ton; 200 tons on the dump assay 60 ounces silver per ton. The owners are Gorman & Dwyre.

The Bonanza Prince and Bonanza Queen are adjoining claims—test shipments of average ore yielded 80 ounces silver per ton; owner, C. C. Quinn.

The Pitman mine has been developed by a 75-foot vertical shaft, sunk in the country to strike an inclined lode at a depth of 500 feet; crosscuts and levels are to be run each 100 feet. The vein on the surface shows a width of four feet of 75-ounce ore; owners, E. Hahn and others.

The Perseverance Company's property consists of the Perseverance mine, the Buster and Perseverance North. On the Perseverance the main working shaft has reached a vertical depth of 250 feet. The vein in the bottom is four feet wide. It is the intention of the owners to thoroughly develop the mine before milling any ore. A five stamp mill has been erected on the property, which is owned in Pennsylvania.

The General Custer is a gold mine developed by a shaft 30 feet deep. The grade of ore is $20 per ton and the claim is owned by C. C. Quinn. The remaining locations on the belt have been but little developed and only enough work has been done to keep up the yearly assessments to hold the claim.

The Gold Belt Mining District,

Segregated from the Providence district, is on the northerly flank of Providence mountain. The gold bearing rock lies in streaks, pockets and bands inclosed in a calcareous belt which forms the gangue of the vein. These mines have been but little developed—not enough to prove their extent or value.

The district was formed in 1886 and detached from the Providence on the discovery of its gold-bearing character by Messrs. Wett and Steidel. Of the many locations in this new district, the following are the best developed and the most prominent:

The Toughnut

Has been developed by two shafts, each 60 feet deep, from which considerable ore has been extracted and shipped for reduction, after having been hand-picked and assorted to values ranging from $150 to $200 per ton. The second-class ore that remains in sight in the mine and on the dump ranges in values from $60 to $80 per ton in gold. This appears to be about the average value of the ores in the mine, with rich pockets and bunches. The property is owned by Messrs. Wett & Domingo.

The Toughnut extension shows some good ore in the croppings, with but little work of development.

The Greyhound

Is situated on the dividing ridge, but included in the Gold Belt District. The product is silver, with values of 50 ounces per ton. It is developed by two tunnels of 100 feet each. The ore occurs in irregular streaks and bunches. The mine is owned by Wett & Domingo.

The Salazar mine is in the vicinity of the Toughnut. The vein is small and carries ores of both gold and silver. Selections have paid in mill $100 per ton. The mine is owned by Salezar and Cordovo. The Madison mine, in the same locality, has not been sufficiently developed to prove its value.

There occur in this district quite a number of springs of considerable strength, which are known as the Summit, Nos. 1, 2 and 3; the Cornfield, the Small Spring, and the Vorhogo.

Arrow District

Forms the third subdivision of the old Providence District. It covers the entire southerly portion of the Providence Mountain range from east to west, and from north to south that portion that lies between the Vorhogo pass on the north to the Granite pass on the south, embracing a considerable extent of country. This district was formed in 1878. Gold is the predominating metal.

The mine first located is known as the Domingo. It has been worked in a desultory manner by Mexicans to a depth of 40 feet. Arastras have been used for reducing the ore and extracting the metallic product. At that depth the ore became base and unfit for the arastra, and work was discontinued.

Other Prospects.

La Prieta was discovered in 1885. This mine has been developed by a number of shoal shafts, the deepest being 50 feet; vein 12 inches; ore assorted to values of $135 and shipped to reduction works. The owner is J. N. Domingo.

The Golden Queen has a shaft 60 feet deep; adit 40 feet; vein 10 inches; ore values $90 per ton. Joyce & Kean are the owners.

The Hidden Hill mine has but little work of developments. The owner is P. N. Kean.

The Tip Top is developed by pits 40 feet in length and open cuts carrying 12 feet of backs. The ore from this mine has been packed nine miles to water and worked in arastras, yielding an average of $50 per ton. The owner is Richard Gorman.

The Red Cloud has a vein from two to three feet thick. The ores range in value from $8 to $20 per ton. Owner, P. N. Kean.

The Pass mine is a small vein running from $8 to $50 per ton in gold. Owner, Richard Gorman.

Northerly and westerly from our standpoint, an extensive elevated mountain range is seen, its lava-capped summit forming a table-land apparently without a break as far as the eye can reach. Easterly, a broad and extensive valley lies at our feet, through which passes the Atlantic & Pacific railroad. The valley shows every evidence of intense volcanic activity at no remote period, geologically speaking. Mud cones of greater or less dimensions dot the plain. We descend into the valley easterly and at a distance of 20 miles reach Fenner Station on the A. & P. R. R., where we are hospitably entertained by Messrs. D. O. Earle & Co. and genial "Bob" Hunter.

(To be Continued)

IT is announced that the first of Pennington's air ships, built for the Mount Carmel Aeronautic Navigation Company, will start about January 1st from Mount Carmel for New York, via Chicago and St. Louis. Possibly the date may be postponed to April 1st, owing to circumstances beyond control, and which no gift of prescience could have foreseen.

Development of the South.

It is, of course, true that the South is developing in an industrial way very rapidly, probably more rapidly just at present than any other section of the country; but we believe that some allowance must be made for the published accounts of new enterprises coming from that quarter. The *Manufacturers' Record*, of Baltimore, which confines its operations almost entirely to the South, gives far more attention to the collection of information regarding the formation of new manufacturing enterprises than any other paper we know of, being, in fact, devoted mainly to this work. It has correspondents at all points through the South, who send in accounts of new enterprises, and it is evident that these correspondents do not assure themselves in every instance that a proposed factory or other enterprise is to be a bona fide thing, but simply send in an account of everything talked of, and a new account at every stage of its progress, provided there is any progress. Then, too, there is considerable evidence that men who are interested in real estate take pains to have it announced that a company with a very large capital stock has been formed, and will build immense factories in the town where this real estate is located, often stating that this concern is to move from some northern or eastern town. Every such report that people can be made to believe, helps in obtaining high prices for lots, and hence the incentive for the invention and circulation of the reports.

It is well-nigh impossible for any newspaper to sift and ascertain the full particulars regarding each and every one of these matters, and the only thing that can be done is for those interested to go through the sifting process before becoming involved in any way. Attention has been called to the fact that a single issue of the paper named recently contained notices of the formation of companies for various industrial purposes in the South, representing a capital of $10,000,000. It is a weekly paper, and it is easy to see that, if all these were bona fide, there would soon be no room left there for agricultural operations.

We repeat that it is true the South is advancing rapidly in these matters; but to those who might be inclined to think, from the preponderance of manufacturing news from that quarter, that the rest of the country was soon to be rendered of secondary importance in manufacturing matters, we would suggest going a little slow toward such a conclusion.

THE STATE OWNERSHIP OF RAILWAYS IN FRANCE.—When the network of State railways was created in France, it was intended to serve as an example of economical management and efficient working for the great companies. Whether those expectations have been realized may be judged from the results obtained in 1889. By purchases of lines originally, and subsequent extensions, the State network now forms a total of about 1650 miles. Their cost was about 800 millions, and the receipts last year exceeded the working expenses by 8,258,697f. The net revenue on capital was consequently a little over one per cent, and as the purchase-money was raised by the Treasury at four per cent, including the sinking fund, the actual loss on the year was nearly 24 millions. The proportion of working expenses to receipts was 76½ per cent, while those of the great companies ranged from 44 to 55 per cent. It must be admitted that all the great trunk lines belong to the companies, but they have also a number of secondary lines, worked at 80 or 90 per cent, or at a loss, the construction of which was imposed on them. The companies, however, pay a large sum to the State in the form of stamps on their shares and debentures, taxes on transfers, and dividends, etc., while the State lines yield nothing. The experiment can scarcely be considered a success.—*London Railway News.*

CURVES AND CABLE GRIPS.—The Consolidated Piedmont Cable Company of Alameda was made defendant in a suit in equity filed in the United States Court last week. The complainant corporation, the Pacific Cable Railroad Company of this city, alleges an infringement of certain patent rights by the defendant. It claims that Andrew S. Hallidie invented a tramway for curves and cable grips and obtained a patent for them. In June, 1886, he transferred all his rights and interests in them to the Pacific Cable Railway Company. After the issuance of the letters patent, it is asserted the Piedmont company made and used and is now using an infringement of the patent. The complainant desires such damages as the court may deem proper, demands a delivery of all apparatus infringing the patent, and wants an injunction against its further use by the defendant.

NITRO GLYCERINE ABSORBENT.—Towle Bros. have cut 12,600,000 feet of lumber this year. The pulp-mill will start up soon on material from 2000 cords of tamarack and fir. The firm has just placed in the pulp-mill a plant to convert sawdust into dry pulp for the use of giant powder manufacturers, says the Truckee *Republican*. The sawdust is ground very fine between millstones and is bolted like flour. It is used as an absorbent of nitro-glycerine in the manufacture of giant powder and other explosives. Its production is a new industry on this coast, and much of it has even been brought from Norway. Towle Bros. utilize the dust from their sawmills and also from the planing-mill for making this new material.

Black-listing Men.

The Supreme Court of the State of Texas has recently decided a case which has an important bearing on the matter of "black-listing" men by railroad companies. A man named Behee, who was formerly employed by the Missouri Pacific railroad, was discharged for alleged incompetency, and at the same time was black-listed, so that he could not obtain employment on any of the roads of Texas. He brought suit for damages and was defeated in the lower court, but on appeal to the higher court was awarded $10,000 damages.

Where a man has been employed by a railroad company and has clearly shown that he is incompetent, and therefore liable to cause loss of life and property, it would certainly be a good thing if, by some means, other roads could be spared the trouble and responsibility of also making a trial of him to again demonstrate his incompetency, especially as this demonstration is liable to cause loss of property by the road, and of the lives of fellow-employees or passengers. Black-listing, if it were only employed in the case of men who were clearly and indisputably incompetent for railroad service, would accomplish this object and would result in substantial justice being done. But as it has been carried on, it has resulted in a great deal of injustice and undeserved hardship. Men who have offended the officers of roads in some way for which they were not in the least to blame, have in many cases, by the operation of the black-list, been prevented from obtaining positions by which they could obtain an honest living. We suppose that where a man has shown clearly that he is mentally or physically unfitted for service on a road, and that it is therefore dangerous to employ him on one, the courts would uphold the roads in protecting themselves against him; but it is a good thing that it has been by this decision shown that the black-list if used at all must be used with great care, and for good and sufficient reasons, not on account of the whims of any one, nor his personal spites.

THE MANUFACTURE OF RUBIES.—What is the use of exploring unknown and dangerous countries for rubies, when the secret of their artificial production has been discovered? This was the question which the Academy of Sciences discussed on the report of MM. Fremy and Verneuil, who for some time past have been making chemical experiments in the manufacture of these stones. More valuable than mere theory was the fact that the two chemists exhibited some hundreds of specimens of the glittering red crystals they had succeeded in producing. The rubies were admitted by all to be much superior to anything hitherto manufactured. No little danger, however, attends the process. The chemicals have to be fused at a heat so intense that M. Verneuil during the course of the experiments nearly lost his sight. While manufacturing rubies the two chemists found that at a certain stage of the operations crystals of the color of sapphires were produced, but the hue hitherto obtained has not been equal to the tint of the real gem.—*Pall Mall Gazette.*

HEINRICH SCHLIEMANN, the famous archæologist, died at Berlin on Dec. 25th. He amassed a considerable fortune in commercial pursuits and was able to devote much time to the study of the classics. In 1863 he retired from business with the intention of exploring the Troad, but deferred the work until 1870, when he sought the historic ground which, largely through his efforts, has yielded treasures of incalculable value to archæology and to modern knowledge of that fabled land. He spent the seasons of 1871-3 in excavating the plain of Hissadik, which he has ever since maintained to be the site of ancient Troy. This exploration has been his chief but not his only work. He published many volumes containing the result of his researches, and elaborate arguments based upon them.

MORE than half the railway track in the world is on this continent, and nearly half of the whole is in the United States. This proportion may or may not be kept up, as Asia and Africa are beginning to shorten their long distances by using steam horses on the iron track. In the past four years 40,000 miles of track have been laid in America, and in the United States 30,000 miles of this, while all the rest of the world built only 24,000. Railroads in Europe cost an average of $115,000 per mile. Here the average cost is $60,000, and this is about the rate elsewhere. Rates of fare are, however, lower in Europe than here, the denser population and lighter expense for running the roads more than offsetting the difference in their original cost.

ACCORDING to recent news from Brazil, there are now 60 steamers plying on the Amazon, nearly all of them belonging to British capitalists; and it is stated that this commercial fleet will be greatly enlarged before the end of another year through British enterprise. Many of these steamers are of heavy tonnage and are more staunchly built than those that ply on the Mississippi. They carry on business with the towns along the banks of the Amazon, and some of them traverse its main affluents, the Rio Negro and Rio Madeira, while others go so far up toward its navigable headwaters that there is now a probability of its soon becoming a highway for Peruvians bound for Europe.

San Bernardino County.

Its Mineral and Other Resources.

NUMBER XXV.

[Written for the PRESS by JAMES H. CROSSMAN.]

Exchequer Mining District.

From Fenner station to Goff, on the line of the A. & P. R. R. (distant 12 miles), we enter the southwesterly border of the above-named district, which is north of the railroad and in the northerly extension of the Pah-Ute range of mountains. It embraces an area of 402 square miles. The formation is lime, porphyry trap and secondary granite. This district, though extensive and rich in mineral wealth, has been but little prospected, owing to a scarcity of water—there being but three springs of note in this extensive area. Two of these are near the Cashier camp, and the other, known as the Piute Spring, is situated in the extreme northeasterly portion of the district.

The principal mines of the district occur in the vicinity of Cashier camp, seven miles by road northeasterly from Goff station.

The Exchequer mine has been developed by two shafts, one of 40 and the other of 30 feet. The gangue of the vein is quartz varying from one to six feet in width. The ores are chlorides of silver; values from 50 to 150 ounces per ton. The vein in depth is a well-defined quartz, white, but barren of ore.

The Dreadnaught has an 8 foot ledge and a 50-foot shaft. The grade of the ore exposed varies from one to 600 ounces of silver per ton. This mine, like the Exchequer, is barren in depth so far as tested. The remaining three locations are undeveloped.

The northerly series of the parallel veins consist of the Center No. 1, the most easterly; thence westerly on the same vein, the Bermuda, Anchor and Center West extension, none of which have any developments of note.

Of the southerly vein of the series, the Cashier is the best developed. There are three shafts of 10, 75 and 150 feet respectively. Lateral drifts are being driven on the vein between the shafts on the 70-foot level for working and ventilation purposes, and preparations are being made for sinking No. 1 or East shaft to the 200-foot level. From these workings, two carloads of ore have been extracted and shipped to San Francisco, which yielded $100 per ton. One-quarter of the value was gold and the remainder silver. The ores of these mines to all appearances go to the deep and the prospects are encouraging for a good mine.

The remaining locations are known as the Cashier Extension East, Occidental, Perseverance and Phœnix. The Cashier proper is the central claim, and W. K. Aldersley, Consulting Engineer of the Waterloo mines of Calico, is the leading spirit of the enterprise.

The Vontrigger Mines

Are situated nine miles north of Goff Station and comprise a blanket or surface deposit of the ores of copper, carrying both gold and silver. The croppings show a width of 60 by 200 feet in length. Developments consist of numerous pits and three small shafts. The ore obtained runs from 5 to 40 per cent in copper carbonates and oxides—the latter predominating. The silver values vary from 2 to 10 ounces; the gold averages $6 per ton. A shipment of selected ores has been made to San Francisco, yielding a small profit over expenses. Water is hauled from Homer station, a distance of 10 miles, to supply the camp.

The Sacramento Mining District

Corners on the northwest at Homer station on the A. & P. R. R. Its dimensions are 144 square miles. The easterly boundary line is 12 miles from the Colorado river at a point opposite the Needles. This district promises to be an important gold-producer. The veins are of mammoth proportions and well-defined gangue quartz, carrying free-milling gold ore. The principal mine is known as the Ibex.

We retrace our steps and return via Homer, Goffs and Fenner to Danby and prepare for a visit to the celebrated old woman of Old Woman's mountain in which is situated the

Scanlon Mining District.

To avoid repetition, the reader is referred to the MINING AND SCIENTIFIC PRESS of Aug. 9th, which contains Article No. 5 of this series, in which is a description of the Old Woman's mountain and its mineral features. On the summit of the range there are two figures standing in bold relief against the horizon that bear a strong resemblance to the female form dressed in modern costume.

The axis of the range is granite, through which courses diagonally a belt in which a powerful vein of quartz and baryta occurs, carrying the ores of lead and silver in the form of carbonates, galena, brittle silver, and chlorides of silver. Values vary from 20 to 60 per cent of lead and from 10 to 65 ounces of silver per ton. The vein is strong, well defined and traceable for a distance of more than 6000 feet. The Buckeye has been considerably developed by shafts and drifts; the Keystone is adjoining; and others are the Hawkeye, Silver Wave, and Thompson. These claims are situated on what is known as Carbonate Hill. Their course is northerly and southerly and their strength from 30 to 50 feet. From this vein in an easterly direction on Mineral Hill in the granite proper, an extensive group of small silver-bearing veins occurs, carrying high-grade ores. Their locations are as follows: Big Chief, Old Lady, Silver Cliff, Morning Star, Golden Eagle, Silver Top, Stella, May Queen, Silver Leaf, Hunter, Little Giant, West End, and Mayflower. The Hunter has a 200 foot tunnel showing high-grade ore. The Little Giant has a 10 foot cut, the Mayflower a 50-foot shaft. The developments, though insignificant, give promise of great future values. Robert Hunter is the moving spirit of the mines of the Scanlon district.

Returning to Danby, we take a southeasterly direction, leaving the Old Woman and her mountain on our left hand in a northerly direction, and at a distance of 25 miles at the southerly extremity of the mountain we reach the bed of what was at one time a saline lake of considerable extent, judging from its basin-shaped formation and an intensely saline deposit found in its center of about three miles in circumference. This deposit is known as

Crystal Salt,

A very appropriate name, as aside from its beautiful, clear, transparent, crystalline structure, it is very near chemically pure chloride of sodium. Near the center of the bed a shaft has been sunk 60 feet. This crystallized product returned, by analysis at the California State Mining Bureau's laboratory, 97 per cent pure salt. Water was encountered at a depth of 33 feet, which, on evaporation by the sun's rays, returns a pure saline powder suitable for table use or for any other purpose for which salt is used. This salt has been mined, hauled to Danby on the A. & P. R. R., and shipped to Arizona and Mexico for curing beef, salting stock, and for ordinary purposes. W. H. Drew of San Bernardino is the owner.

(To be Continued.)

A New Mining District.

A new mining district has just been formed, to be known as the Soda Creek mining district. It is situated on the headwaters of Little Kern, about 40 miles northeast of Porterville, and includes the Tule ranch 14 miles from Springville. John M. Nelson has been elected recorder. The boundaries commence at the southwest corner of Section 33, Township 20 South, Range 31 East, and runs a northeast course to the summit; thence northerly on the summit on the dividing range of the waters of Kern and Tule, passing the waters of Mountaineer, Alpine, Soda creek and Little Kern, taking the divide between Big and Little Kern to the mouth of Little Kern; thence west on the Standard line to the place of beginning.

The district is well watered and well timbered. There is about a full township of the mineral deposit, mostly iron and limestone bases. The ore as yet developed is low grade, but evenly distributed and free from rebellious ores. The surface ore is of low milling grade, going from $2 50 to $4 per ton.

Eight or ten parties have made locations, among whom are Dr. Todd Martin and others of Tulare, Crowley Brothers of Visalia, Garner and others of Red Bluff, and the Gilliams of Porterville, Dr. Hathaway of San Luis Obispo, and several others of Tule river and elsewhere.

There is two feet of snow on the ground, the altitude being about 9000 feet, the trail not being very safe for travel without a guide. Mr. Nelson and others are trying by subscriptions to raise a fund to make a good trail, in anticipation of the amount of business likely to be passing between Porterville and the mines of the district the coming spring. The immense quantity of paying milling ores lying about the surface is a pretty satisfactory indication that there is an immense body of rich ore lying under and near the surface which will, with plenty of timber and water at hand, promise to make a district of great importance in the mining world.—*Monache Tidings.*

Hunting for Coal.

The high price of coal in the San Francisco market at the present time has evidently agitated the work of discovering coal deposits in California. At all events, prospectors have gone to work in a dozen localities recently. Two companies have been organized to prospect for coal in San Mateo county, where small deposits have been known for several years.

It has been learned that at Carmelito, in Monterey county, a coal chute with a capacity of 250 tons will be erected. The chief engineer of the California and Nevada road, with a corps of assistants, is at present engaged in making a survey for a railway to the coal mines. Coal of excellent quality is said to exist in the mine. The latest reports from Covelo, near Ukiah, state that there is no longer any doubt of the evidences or extent of the coal deposits in the neighborhood of Round valley, in Mendocino county. The deposit, it is said, is larger than any yet found on the Pacific Coast. The coal vein in Mendocino county is known to extend north for nearly 60 miles into Trinity and Humboldt counties. In many places the vein has been found to be 20 to 30 feet thick. More than two-thirds of this new coal-field belongs to the United States Government, being located on the Round Valley Indian Reservation, which is now being appraised by a commission appointed by President Harrison.—*Chronicle.*

Mapping the Death Valley Region.

As a result of the expedition to explore Death valley and the contiguous country, many new species of mammals are being received by Prof. Merriam of the Agricultural Department, and the work has only just commenced. This exploration has nothing to do with the Geological Survey, so that all the stories about searching for lost mines and fabulous treasures of precious minerals are absolutely without foundation, as the object sought for is simply to trace out the life zones and embody the result of the observations in an elaborate report with maps that will be of great benefit to this and future generations. Twenty thousand square miles of territory will be surveyed this season, taking in parts of Kern, Inyo, Tulare and San Bernardino counties in California, and a small corner of Nye county, Nev.

Death valley forms a small part of the territory laid out for the season's operations, and it will be completely covered during the winter months, so that the distressing heat of summer may be avoided. When the temperature becomes intolerable on the sandy wastes of the desert, Prof. Merriam's men will rise to the higher altitudes of the parallel mountain ranges on each side of the valley, all a terra incognita so far as things agricultural are concerned, including Mt. Whitney, the highest peak in the United States.

When they have gone over the ground thoroughly and made the necessary experiments, they will issue maps, showing the different life zones in colors, with another series of maps showing the special species and groups of species, also in colors, so that when it is proved that a country is habitable and the ground susceptible to profitable cultivation, farmers will be able to turn to these maps and trace out just where they can raise certain things without being put to the expense of costly agricultural experiments. The causes which led to the distribution of animal life serve to indicate the distribution of crops, and Prof. Merriam will be able to tell with great accuracy what will thrive at certain altitudes, on certain slopes, under certain conditions. His purpose is to map all of the Western United States in this manner.

With reference to this particular section, the professor says that owners of comparatively small farms can locate their lands so as to take in two or three distinct life zones, giving them opportunities to harvest various crops at almost all seasons of the year. Prof. Merriam will leave for California about March 1st, in time to join his two parties of explorers when they have come together in Death valley, preparatory to going to the mountains. One party has already entered the unknown country from Nevada, and the other should leave a point in San Bernardino county in a day or two, working northward.

This expedition will be by far the best ever fitted out by the Government for a similar purpose. In its personnel it is unequaled, men composing it standing prominent in their various branches of science. Vernon Bailey, the second in command, has been chief field naturalist of the United States for four or five years, with a large and valuable experience in the West, both the summer and winter. He is accounted the best collector of mammals in the world, and one of the very best field naturalists anywhere. He was assistant to Prof. Merriam in the biological survey of Arizona two years ago and was with him in Idaho and Nevada last season. Like his chief, he is not content with sitting in an office in Washington, but must be in the field, where the work involves great hardship and much privation, besides arduous labor.

T. S. Palmer of California, and one of the best all-round men in the service, is the man in charge of one party, and Prof. Merriam relies upon him for much of the success of the expedition. He is assisted by E. W. Nelson, who spent five years in Alaska and published a quarto report of his travels, which include a sledge journey of 3000 miles alone with his dogs and a native guide. During this journey he ruined his health and was forced to live in California.

Dr. A. K. Fisher of New York will be the practical man of the outfit, being an expert at trapping animals, shooting and snaring birds and preparing skins. Besides, there will be a botanist of note, and instruments will be carried to make accurate topographical surveys and measure altitudes. Prof. Hinton, Chief of the Irrigation Department, is trying to arrange his affairs to join the party, and if he succeeds he will be a valuable acquisition. No effort will be made to look for gold or silver, as it is purely an agricultural, not a mineral, project. —*Chronicle.*

TO DIG FOR PETROLEUM.—A lease for 9362 acres of land lying in the Mattaly valley, near Eureka, Cal., comprising portions of the ranges of J. Chambers, O. Freeze, C. A. Johnson, C. A. Miner, J. Walker, D. Zanani and C. Miner, was filed for record recently. The lease is given for 50 years, and the lessees, C. A. Barrows and Irving Foulke of Ventura, agree to develop the petroleum supposed to be abundant in that section. One well is to be sunk within three years, and others to follow. The lessors are to have ten per cent of the net proceeds of the oil. Provision is made in the event of discovery of other minerals.

For Reducing Ore.

The lonely-looking structure on the south bank of the channel below the Crown mills has been a puzzle to many persons who have observed it. That shed is the nucleus of what may be a great manufacturing enterprise in the near future. It is a place where J. R. Moffit is perfecting his invention for reducing refractory and other ores.

The machinery for the purpose, which is nealy perfect, is very curious yet very simple in principle. The first device might be called a triple furnace. It consists of two cylinders, one inside the other, and over the furnace proper. In the inner cylinder the ores are placed after being reduced almost to a powder by a crusher. The inner surface of this has ridges a couple of inches apart and about half an inch wide. The outer cylinder is filled with wood, and when both are filled they are tightly closed so that no vapor can escape. Fire is then raised in the furnace and the heat is raised by a pressure blower, which maintains it in the proper degree to char the wood in the outer cylinder and fuse the ores in the inner chamber. While this process is going on, the inner cylinder with the ore is made to revolve, while air is introduced into it from without. The ore being lifted by the ridges falls from them when near the top, when by the burning of the oxygen of the air the heat is raised to the fusion point and the ores reduced to ashes.

When thus reduced the ashes are forced into a tank of water where they are held in solution and drained off while not a particle of the metal is lost. In a report of the Superintendent of the Mint in San Francisco some years ago it was estimated that gold and silver worth $85,000 had been carried up the smokestack and wasted in one year by the draft required in the ordinary process of fusing those metals. All of Mr. Moffit's processes being performed under pressure, no vapor escapes. In the process of reduction the metal is necessarily reduced to particles so minute that an idea of their lightness may be gained from gold leaf, which, though a breath may blow it away, is not so light as the infinitesimal particles to which his process reduces the metal.

From the tank where the precious metal is precipitated, it is transferred to an amalgamator where it is gathered by means of quicksilver, the process of which is familiar to those who know aught of mining and its kindred industries.

By the Moffit process a vast amount of ore that will not now pay to work can be made profitable. Hitherto, very low-grade and refractory ores have been unprofitable by reason of the waste which this process saves. It is quite as well adapted to rich ores because the process is as ready as any other, while saving so much of the product.

Mr. Moffit is not a novice or a speculator in these matters. He i an experienced miner and metallurgist, and has been almost the only successful prosecutor of river mining on the Tuolumne, where he has lived many years. He is the owner of valuable property in Tuolumne county, and is the builder of what is known as Moffit's bridge, on the Yosemite road. He has conducted his mining operations there on a large scale. He constructed a dam 36 feet high and carried the water over his mining property through a flume 900 feet long. He had invested a large amount of capital and had gotten down to pay-dirt, where he was taking out $1000 a day, when a freshet of unusual suddenness and volume came down and washed away his work.

Last year he returned to the work undiscouraged and put in a permanent dam which no freshet can injure, and next season will resume operations.

His inventions, which are protected by patents issued in 1885 and 1890, will be ready to be put into the mines during the coming year. He is not seeking to sell territorial or manufacturing rights or any share in his inventions. It is his intention to establish a manufactory in Stockton, make the machines and let them out to miners on a royalty. Though very little public mention has been made of the inventions, mining experts seem to have learned of them, and Mr. Moffit has numerous visitors, all of whom are highly pleased with them and have high expectations of them.

The introduction of the Moffit machines into the mines of California means a vast increase in their productiveness and a proportionate increase of the wealth of the State. The establishment of shops for their manufacture in Stockton will add another and a very important feature to the manufacturing industries of the city.—*Stockton Independent*

IRON MOLDERS' UNION.— This organization has elected officers for the ensuing six months, as follows: President, Joseph F. Valentine; vice-president, George H. Lubbert; recording secretary, Richard Barnett; treasurer, Thomas Healy; inductor, Charles McLaughlin; doorkeeper, F. Herlitz; Executive Committee—E. R. Harper, Joseph Barnes, James Ferguson, Wm. Potter, Thos. Dixon; Auditing Committee—J. D. O Neil, J. de Suooa, A. McDermott.

LEDGES containing gold and silver have been found in the mountains between Glen Ellen and Napa Valley. After the experience of finding gold in the coast range at Los Burros, Monterey county, it may be that good claims will be developed at the new finds in Sonoma county.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

New Mexican Mines.

EDITORS PRESS:—I have sent you no report from this camp for a long time, because there was nothing of special moment to report. With the closing weeks of the old year, however, the camp has taken a new start and is now progressing very rapidly indeed.

In November, Wm. Watson, one of the owners of the property known as the "Old Abe," made discovery of the lead. Mr. Watson had worked upon the property for more than ten years. Many discoveries of rich ore had been made, but in none was there any important lead or any paying quantity of ore. Finally upon a grassy slope, near the "Old Abe" gulch, right under the grass roots, he came upon the apex of the true fissure quartz vein for which he looked in vain so many years. At the surface it was about 18 inches wide. Mr. Watson instantly commenced sinking. The lead steadily increased in width and promise. At a depth of 35 feet it had put 50 tons of ore on the dump, and the owners leased the Glass 10-stamp mill east of town. The trial run cleaned up about 46 tons of rock which contained some surface dirt and water. The result was $33 50 per ton. The mill started immediately after the cleanup on regular crushing work for an indefinite period. At 80 feet of depth the lead shows five feet of fine quartz ore, at least as rich as the first millrun, and produces ore at least as fast as the old mill can crush it. The lead has now been traced several hundred feet, apparently maintains its value so far as traced, and another permanent producer has undoubtedly been added to the old resources of the camp. The property is under the personal management of the owners and will be worked for what there is in it and for all it is worth. Better still, a large majority of the ownership is in the camp, and the profits will consequently stay here for investment.

In November, B. H. Dye, co-owner of the Lady Godiva, resumed work upon the 450 level, drifting north on the No. 1 vein. On Christmas eve he struck the south edge of the great ore chute which is known to extend to the surface. The ore is a very rich black-and-white quartz, of which there is now between three and four feet. Milling operations upon this ore body will begin shortly, and still another permanent producer will result from Dye's persistent work.

Both of these new producers lie upon "East Baxter" mountain. The ores of this section of the mountain are quartz and the ores are found in fissure veins and are of exceptionally high grade. The ores of West Baxter are usually porphyritic or granitoid, can hardly be called "veins," and are of much lower average grade.

The North Homestake, for the past four years the property of James M. Sigafrio et al of Tarrytown, N. Y., has been worked in a small way to supply a mill of two five-foot Huntington centrifugal machines.

There has been a slow but steady development until the Solitaire shaft on the property has attained a depth of 960 feet. (By the way, by several hundred feet the deepest work in New Mexico.) At that depth 30,000 tons of ore are in sight upon a very conservative estimate. Upon this showing the property has been sold to Chicago and New Mexican parties for $250,000. The purchasers will take possession, it is understood, on the 15th inst. The purchase was negotiated by John A. Miller, Esq., of Silver City, N. M., well known in the mining world on account of his successful operations at Lake Valley, Pinos Altos, Cooney, Carlisle and elsewhere. Mr. Miller is personally interested in the purchase, and will, it is understood, be for a time at least the manager of the property.

Mr. Miller is a man of wide experience in New Mexican mining, having been a resident of the Territory for 25 years. He is of abounding energy and push, and I risk nothing in saying that the North Homestake property under his management will be worked for all it is worth. The purchasers contemplate very large additions to the equipment of the mine; the use of a much larger compressor plant than that now in use; a new mill equal to at least a hundred tons a day, and other additions to their facilities for the rapid extraction and economical treatment of their ores.

All these developments have energized the camp (very dull for the past two years) and the good effects are already perceptible.

Developments proceed in the Jicarilla camp, eight miles north of us, with very promising results. That camp cannot, however, prosper until the introduction of capital. Rolla Wells is at work upon his Helen Roe mine in Nogal district, 20 miles south. From the level being run each way from the 140-foot shaft at a depth of 50 feet, nothing but ore is taken out, and that of a very high grade.

Near Tres Rios, 35 miles south of us, very rich silver ore has been found upon the Mescalero Apache reservation, on which considerable quiet work is being done. Petitions for the reduction of the reservation by the two townships involved in the new mining discoveries, have been sent on to Washington. The application will probably be successful, as they will meet with no opposition from this domestic and thoroughly peaceable tribe of Indians.

The Mescaleros make no use of the portion of the reservation desired for mining purposes, and care for no parts of the reserve except those used by them in farming and for the grazing of their cattle. In fact, the most influential portion of this tribe desire to obtain lands in severalty, abandon the reservation system, and thus insure their own permanence in the country in which they reside and which has become dear to them. The year 1891 will, I have no doubt, develop in the Tres Rios region a valuable silver camp, to the great benefit of the surrounding country. The silver ores so far exposed in the new camp are of a grade which will stand the necessary wagon transportation of 100 miles to railway. * * *

White Oaks, N. M., Jan. 10, 1891.

Mines Around Daggett.

EDITORS PRESS:—We are having cold raw winds but no snow in this vicinity. Recently one-third interest was sold for $5000 in the McShane mine to the Barber Milling Co. of Calico. A claim on Stockton hill, near Kingman, has also been sold to Robert Whiteside of Los Angeles for $9000. Some mines down here are progressing in development more than ever before, especially those accessible to railroads. We have, however, little confidence in tenderfoot speculators who will not risk more than $500 to test a mine. They prefer cheap claims and seem to want such as can be handled in the Stock Boards. We would like to see some bona fide mining investors in this part of the country who will pay for a good mine when they see it. S. P. BLADE.

Daggett, San Bernardino Co.

Coast Coals.

J. W. Harrison furnishes the following review of the local coal market for the past year:

This has proved a very profitable year to all engaged in this trade, especially to the owners of the coast collieries, as the ruling figures for the past six months have left them a very handsome margin over the cost of production. To evidence how marked have been the fluctuations during the year, spot cargoes of Australian coal changed hands in January last at $6.75 per ton, some cargoes of a similar grade were sold last month at $11.50 per ton, and only a limited quantity was procurable at that figure. These exceptionally high figures were not the result of any combination or trust among the dealers—simply the demands exceeded the supplies. From May 15th to September 10th no coal was shipped from the Wellington mine, and from August 25th to November 10th no cargoes were loaded in Australia. With these two principal sources of supply cut off, and at a season of the year when most in demand, the increase of values can be readily explained. The labor troubles having been amicably settled, shipments are now coming forward freely and values are declining, English and Australian cargoes being offered at lower rates for future delivery.

The following table of prices will show the monthly fluctuations of foreign coals for "spot" cargoes—the average price being given for each month:

	Australian Gas.	English Steam.	Scotch Flint.	West Hartley.
January	$6 75	$8 00	$8 50	$9 00
February	6 75	7 75	7 75	8 50
March	7 12	7 62	8 00	8 50
April	7 50	7 75	8 00	8 50
May	7 50	7 75	8 00	8 50
June	7 62	7 75	8 00	8 50
July	7 85	8 00	8 25	8 50
August	8 50	8 37	8 75	9 00
September	9 00	9 25	9 50	9 75
October	10 00	10 00	10 50	11 00
November	11 50	11 25	11 50	11 75
December	11 00	10 50	10 50	11 00

The various sources from which we have derived our supplies are as follows:

	1889.	1890.
British Columbia, tons	417,904	440,571
Australia	408,032	194,725
English and Welsh	32 890	33,145
Scotch	12 727	1,610
Eastern (Cumberland and Anthracite)	18,950	31,950
Franklin, Green River and Cedar River	209,137	216,760
Carbon Hill and South Prairie	163,377	191,109
Mount Diablo and Coos Bay	87,600	74,210
Japan	1 340	13 170
Totals	1,351,957	1,197,250

To insure a correct statement of the consumption of the State, I have included all the arrivals at San Pedro, 70,954 tons, and San Diego, 52,358 tons.

As the freight from foreign ports is the principal factor in establishing coal values, it is a query how our market will shape itself in 1891. A seasonable rainfall, producing bountiful crops, assures us a large influx of vessels that will be principally coal-carriers. This, of course, signifies low-priced fuel, but the season is not sufficiently advanced as yet to hazard an opinion. Notwithstanding we are now receiving 75 per cent of our coal from our coast mines, the local agents of the northern collieries regulate their prices by the import cost of foreign grades.

The imports of foreign coke for the year amount to 18,309 tons, as against 21,624 tons last year.

San Bernardino County.

Its Mineral and Other Resources.

NUMBER XXVI.

[Written for the PRESS by JAMES H. CROSSMAN.]

Iron Mountain.

About ten miles in a southeasterly direction from Crystal Salt, an elevated mountain peak may be seen, the length of which is 12 miles and the width four. The formation is dolomite and porphyry. The name Iron Mountain was suggested by the deep red iron oxides which stain it, forming an iron hat of considerable extent, which can be plainly seen from a long distance. This forms the gossan or cap of a vein of copper ores of evident value, the ores carrying on an average about 38 per cent copper, 20 ounces silver and $75 gold.

Chuckawalla Springs

Are eight miles distant from Iron Mountain in a northwesterly direction, and about 50 miles east of Salton, a station on the Southern Pacific railway in the desert regions. These springs are located in San Diego county, not far from the line of San Bernardino county. In their vicinity is an important mineral district in which lead-silver ores and gold-bearing rock occur in strong, well-defined veins.

Assays from the Nonpareil, one of the principal and most promising mines, give 50 per cent lead, 20 ounces silver and $75 gold per ton. The vein, which is a contact between porphyry and lime, is about four feet in width.

The foothills of the Colorado river range have long been known to contain strong veins of copper ore of high grade. Leaving the eastern and northeastern portion of San Bernardino county, we enter the desert region in the vicinity of

Soda Lake.

A brief description of this interesting region cannot fail to be of interest. There is a tradition among the Piute Indians to the effect that during the time of their forefathers, what is now Soda Lake was at that time a vast sheet of water 20 miles long and 8 wide, which must have been fresh, as the legend says the waters teemed with fish. It is situated 500 feet above the level of the sea. There are times when this great natural reservoir is filled to the brim, particularly when heavy cloudbursts occur on the slopes of the neighboring mountains, and the waters rush in torrents down into the basin. Then the subterranean channel or outlet is flushed and found too small to carry off the flood. So great is the pressure that the lake-bed becomes a veritable geyser, spouting mud and water violently. On the southwest side of the lake is a considerable area covered by sand-dunes, which region has been named in grim humor, the Devil's Playground or Hell's Half Acre. During the windstorms which frequent this section, millions of tons of sand are shifted in a great circle about 12 miles in diameter from one side of the lake to the other, the central portion of the area remaining seemingly undisturbed, covered by a snowy white crystallization of soda.

Along the west side of the lake for a distance of four miles, occur springs of pure water which flow down to the lake's margin, where the greedy sands swallow up the streams. The largest spring flows from a fissure in the solid blue limestone which forms the bedrock of the region. The water from this spring flows about 18 miles before it is lost in the desert sand. There are numerous other springs on the southeast side of the lake.

Soda Lake station is situated about 75 miles east of Daggett on the line of the old emigrant road from Salt Lake. Its mean temperature is about 80 degrees. To the northward, a deep, rugged canyon has been cut down into the limestone. Passing through this canyon we come to another dry basin, known as Crystal Lake. In size its area is 60 miles, 12 long by 5 wide. This basin is filled at times, though rarely, by the overflow from the Mojave river.

Making our way through another pass for a distance of 12 miles, we reach the confluence of the Mojave and Amargosa rivers, where a spur of the Ivanatz mountains forms one of the river banks. On the westerly slope of this range occur the salt spring and Amargosa mine, which were discovered by John A. Golden in 1849, while on his way from St. Louis, Mo., with an emigrant train. It was this same train which divided at King's Springs in Nevada. It was from this circumstance that the sensational stories arose which have recently been published giving lengthy descriptions of the terrible sufferings and ultimate death of a hundred or more men, women and children in Death valley while endeavoring to cross the desert. The loss of life, though not near so great as reported, occurred with that portion of the train which Mr. Golden left. After leaving the main train in Nevada, he started with his own outfit for Los Angeles, California. Traveling down the Amargosa river, he camped one day at Salt Spring, and it was while here that he made his way up the mountain-side and found a piece of heavy black mineral. Not being familiar with it, but thinking it might possibly have value, he took it with him to camp, eventually taking it to Los Angeles, where he showed it to a number of gentlemen, who at once unhesitatingly pronounced it gold, covered with a black oxide of iron. He was offered $5000 to guide a party to his discovery, to which he consented, though it was with the distinct understanding that should he fail to show them his treasure-trove, or in the event of his becoming lost on the desert, his life should pay the forfeit. Mr. Golden readily consented, for he had every confidence in being able to guide his party directly to the spot.

A party was promptly formed and left Los Angeles to face the dangers of a reported unknown and terrible desert in search of the golden treasure. The hardy pioneer had no difficulty in finding Salt Springs, and went into camp at that place in high spirits; but his satisfaction at having reached his journey's end was soon turned to consternation when he was unable to find the place at which he had discovered the gold. He tried to keep the dreadful fact from his companions for a time, but they were after gold, and soon became so importunate that he was obliged to confess his inability to find the place again, though the while earnestly protesting his good faith. His copartners felt themselves duped, and angrily recalled the unfortunate man to the terms of the contract, coolly informing him that if he had any prayers to say it was time to commence.

In an agony of despair, though believing the place must be near, he sank on the ground and buried his face in his hands. One of the party approached and stood glaring at him, when casually glancing on the ground at the doomed man's feet, he saw a piece of mineral similar to that exhibited by Mr. Golden in Los Angeles. The mine was located, the party then returning to Los Angeles, where Mr. Golden was paid his $5000. A corporation known as the Salt Springs Mining Company was formed, and in 1852 a five-stamp mill was erected and kept in operation continuously during the following winter seasons until January, 1864, at which time the Piute Indians, who were on the warpath, massacred every one at the mine, burned the mill and sacked the camp.

After the burning of the mill, Mexicans secured leases on the property and worked the ore in arastras, realizing, it is said, fabulous sums.

Undoubtedly the mine was of a pockety character, as it was afterward abandoned for years and relocated a number of times. In 1880, under the management of C. A. Luckhardt of San Francisco, the concern was reorganized and listed on the New York Stock Exchange, where the stock sold as high as $15 a share. But little work of development was done at the mine and the entire scheme soon fell through, the mine finally becoming the property of J. B. Osborne of Daggett, the present owner.

The water of Salt Springs contains about the same percentage of chloride of sodium as that of the sea. The altitude is 800 feet above sea level, and it is situated about 60 miles directly northeast of Daggett. At 1 P. M. May 2, 1890, the temperature was 88 degrees in the shade.

The many stories of fabulous discoveries in the desert regions are to a great extent apocryphal and have no foundation in fact. Every mining district has its lost cabin; the desert region its Breyfogle, Lee, Gunsight, Pegleg, and other fakes, on the rediscovery of which both life and money to a considerable amount have been lost without any good results.

My authority for the above version of the Golden discovery and ultimate result is Mr. M. Marsh, one of the earliest pioneers of our State and county, and an inhabitant of the desert regions for many years.

(*To be Continued.*)

THE Mount Morgan gold mine, Australia, paid dividends of $5,363,150 in 1889. This is the greatest gold mine in the world. It was bought a few years ago for $3115 and is now valued at $73,000,000—in fact $90,000,000 have been refused for the mine and works. The machinery and plant cost nearly $5,000,000. During the year ending November 30, 1889, 75,415 tons of raw ore returned 223,522 ounces of gold, equal to 4 ounces 6 pennyweights 4 grains per ton for the total ore raised.

THE Pomona *Progress* says: The Calkins Coal Mining Company has been incorporated at Santa Barbara with a capital of $1,000,000. The mines to be developed lie near to South Riverside. The coal obtained from the South Riverside and Elsinore coal belts is not marked first-class, but it is found to improve in quality as depth is attained.

GEORGE DAVIS, a miner in the Manhattan mine, Grass Valley, becoming faint from powder fumes, fell off a ladder down the shaft a distance of 80 feet. His partner went at once to his relief and found him with his head in the sump. He was quite severely injured, but is now making good progress toward recovery.

GYPSUM.—The Santa Barbara *Press* says: Fifteen men are constantly employed in the gypsum mine in the Ojai, and the quality now being removed is superior to any product heretofore taken out. It is put in sacks at the mine and hauled to Ventura for shipment to San Francisco, where as high as $18 a ton is paid for it.

THE Committee on Library and Museum of the Board of Regents of the State University has asked for an appropriation of $5000 for the purchase of scientific books.

FIVE SHINGLE MILLS at Chehalis, Wash., have been kept running for months, turning out 400,000 shingles a day.

San Bernardino County.

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NUMBER XXVII.

[Written for the PRESS by JAMES H. CROSSMAN.]

Death Valley and Surroundings.

The configuration of Death Valley resembles the letter "S." From Salt Springs on the south to Saratoga Springs on the north end of the valley, the distance is about 12 miles. From these springs it extends in a northwesterly direction for several miles, running thence northerly, finally taking a sweep around to the southward.

About a mile and a half northeast from the Salt Spring mines, sand-dunes have formed a complete barrier across the former confluence of the Mojave and Amargosa rivers. From the present mouth of the Amargosa river to the Amargosa borax-fields the distance is 16 miles. From the same point to McLean's ranch, the distance is 15 miles.

The river-bed proper on its southerly course consists mainly of beds of gypsum, nitrone earth, tufa-beds, sandstone and clay banks, all containing more or less soda, with an occasional deposit of gravel in the beds of water-courses.

From McLean's ranch through the canyon for a distance of 12 miles, about 100 inches (miners' measurement) of water flows on the surface, sinking finally into the desert sand. McLean's ranch is situated on the northerly slope of the hills surrounding the borax-fields.

From the summit of Cave Springs, 30 miles northwest of Garlic (see Article No. VII) to Saratoga Springs in Death Valley, the distance is 13 miles, with an average descent of 303 feet to the mile—a total of 3939 feet. Between Cave Springs and the mouth of Amargosa river, a distance of 18 miles, stretches a waste of sand which shifts about in the fitful gusts of wind or is driven before the blast of a heavy storm.

Saratoga Spring, in all probability, is the outlet of some subterranean channel or reservoir, as its waters are filled with fish—of what species, the Government expedition will have an opportunity of determining. This place is the resort of great numbers of ducks of several varieties.

The spring's basin is about 12 feet in diameter, nearly circular; its water flows upward with such force that a bather cannot sink deeper than his chin, though the feet find nothing more substantial to rest upon than bubbling quicksand. The water averages during the day 92° F. and is slightly alkaline. The spring overflows, forming a small running stream, in which grows a dense mass of tules, flags and aquatic plants. Horseflies, gnats and mosquitoes are abundant—a torment alike to man and beast. We are now in the vicinity of that portion of Uncle Sam's territory (Death Valley) about which so many sensational stories have been published that the Department of Agriculture of our Government has organized an expedition to explore these regions for the ostensible purpose of obtaining some knowledge of its flora and fauna. It is reported that the expedition will consist of two parties—one under Vernon Bailey and the other under Prof. T. S. Palmer. These parties start at opposite points, approaching each other and meeting eventually in Death Valley.

Every schoolboy in the country is aware that Death Valley is about the last place on earth that one would select as a suitable locality to carry on agricultural pursuits. It is to be hoped, however, that the knowledge gained by these learned gentlemen of the expedition will be of such a character as will prove beneficial to the commonwealth in a practical way.

The fauna of the valley is confined to but a few species, and to any but the bug-hunter is uninteresting and of but little value, consisting of an occasional jack-rabbit, rattlesnakes, horned toads, lizards, and insects all of well-known species; but this is not the class of fauna sought for to supply the table of the *bon vivant* or even that of the hungry prospector or pot-hunter.

The springs and other sources of water supply, however, are of vast importance to the desert traveler, and it should be a portion of the work of the expedition to build monuments at these important places and to erect guideboards in order to properly direct the wandering traveler to these sources of the aqueous fluid, showing their direction and indicating the distance. It is all-important, too, that the geologist and mineralogist should accompany the botanist and naturalist, as it is possible there is no portion of the public domain of the United States where valuable mineral deposits occur in greater abundance or possess greater prospective value than the desert regions. Without these adjuncts the expedition will prove a failure and of no benefit. Painted pictures and colored maps are not what our people want. We want something practical and solid. Prof. Whitney published volumes on the geology of California, but forgot all about its mines and mineral resources. What this isolated section requires is fuel and water; with these two important adjuncts, the desert region would become one of the most productive mining sections in the United States. Water can be easily obtained by artesian wells from subterranean channels as well as from springs when properly developed.

The development of subterranean water is too great an undertaking for individual capital, but is it not within the province of the General Government to do this very thing? Such a course will not only promote our mining industry but will reclaim what is now a barren unproductive desert. In that event it would be not only a profitable field for the miner but the agriculturist as well.

The mountain country around Death Valley lies in the form of a triangle.

The Funeral range, whose greatest elevation is 6754 feet, lies on the east with its lava-covered crest extending in an easterly direction for 10 miles and 30 miles westerly to the belted range with a width of 25 miles to the edge of Death Valley. The center of this massive outburst of molten rock is denoted by numerous low-angled coniferous vents bordering the valley on the west. The Panamint range, of which Telescope is the dominant peak, rising to an elevation of 11,047 feet, forms a striking feature and can be seen for long distances. On the northerly borders Chloride Cliff mountain rises boldly with its noticeable white capping; on the south the Black Butte, an isolated peak, is seen overshadowing this "Valley of Death." This butte, notwithstanding its forbidding appearance, contains several fine springs of pure water, 1½ miles distant from the edge of the valley. The valley varies from 8 to 15 miles in width and is 40 miles long. It lies within that area bounded by the meridian 116° 30', and 117 west longitude and parallel 35° 45" and 36° 30' north latitude. On the south branch, valleys extend southeastwardly and southwestwardly; the former known as the Amargosa valley, which has a length of 25 miles; the latter, Long valley, 12 miles long. It has been reported and is generally believed that a portion of Death Valley lies below the level of the sea, but this has never been authenticated by any actual survey, and it is a matter of considerable doubt which the new expedition will determine. The line of the greatest depression, however, lies on the eastern side of the valley, and extends northerly and southerly for 15 miles. The lowest depression is a little east of south from the mouth of Furnace creek. The formation surrounding the valley is composed of stratified sedimentary rocks, sandstones and fossiliferous limestone.

~~(To be Continued.)~~

The Free Coinage Bill.

The Free Coinage bill, which was passed by the Senate, is substantially as follows:

An Act to provide for the free coinage of gold and silver bullion and for other purposes. That from and after the date of the passage of this Act, the unit of value in the United States shall be a dollar, and the same may be coined of 412½ grains of standard silver or 25 8 10 grains of standard gold; and said coins shall be a legal tender for all debts, public and private; that hereafter any owner of silver or gold bullion may deposit the same at any Mint of the United States to be formed into standard dollars or bars for his benefit and without charge, but it shall be lawful to refuse any deposit of less value than $100, or any bullion so base as to be unsuitable for the operations of the Mint.

SEC. 2. The provision of Section 3 of "An Act to authorize the coinage of a standard silver dollar, and to restore its legal-tender character," which became a law February 28, 1878, is hereby made applicable to the coinage in this Act provided for.

SEC. 3. That the certificates provided for in the second section of this Act shall be of denominations not less than $1 nor more than $100, and such certificates shall be redeemable in coin of standard value. A sufficient sum to carry out the provisions of this Act is hereby appropriated out of any money in the Treasury not otherwise appropriated. So much of an Act of July 14, 1890, entitled: "An Act directing the purchase of silver bullion and the issue of Treasury notes, and for other purposes," as requires the purchase of 4,500,000 ounces of silver bullion per month, be and the same is hereby repealed.

SEC. 4. The certificates provided for in this Act and all silver and gold certificates already issued shall be receivable for all taxes and dues to the United States of every description and shall be a legal tender for the payment of all debts, public and private.

SEC. 5. The owners of bullion deposited for coinage shall have the option to receive coin or its equivalent in certificates provided for in this Act, and such bullion shall be subsequently coined.

THE first silver dollars bearing the date of 1891 were coined Monday in the United States Branch Mint in this city, and 50,000 will be turned out every day hereafter until July next. The monthly output for January will be $785,000.

A NEW mining district has been organized on the headwaters of Little Kern river, Tulare county, which is known as Soda Creek district. The ores are of low grade, but free milling. The country is well watered and timbered, and at an altitude of 9000 feet above sea level.

TRUSTEE W. R. ECKART of the Mechanics' Institute states that great interest is being manifested in the freehand and mechanical drawing classes, the former having at present 134 members enrolled and the latter 117.

Mining Corporations.

A Proposed Act for the Protection of Stockholders.

The following is Senate Bill No. 155, introduced by Mr. G. H. Campbell and referred to the Committee on Mines, Drainage, and Mining Debris:

An Act to amend an Act entitled "An Act amendatory of an Act entitled 'An Act for the better protection of the stockholders in corporations formed under the laws of the State of California, for the purpose of carrying on and conducting the business of mining,'" approved March 30, 1874, in effect April 23, 1880.

SECTION 1. It shall be the duty of the secretary of every corporation formed under the laws of the State for the purpose of mining, and the secretary of any other mining corporation doing business in this State, or of which its shares of capital stock are bought and sold in any stock exchange, to keep a complete set of books showing all receipts and expenditures of such corporations, the sources of such receipts, and the object of such expenditures, and also all transfers of stock.

All books and papers shall, at all times, during business hours, be opened to the inspection of any bona fide stockholder, and if any stockholder shall at any time so request, it shall be the duty of the secretary to attend at the office of said company at least one hour in the day, out of regular business hours, and exhibit such books and papers of the company as such stockholder may desire, who shall be entitled to be accompanied by an expert, and be shall also be entitled to make copies or extracts from any such books or papers. It shall be the duty of the directors, on the second Monday of each and every month, to cause to be made an itemized account or balance sheet for the previous month, embracing a full and complete statement of all disbursements and receipts, showing from what sources such receipts were derived, and for what and to whom such disbursements or payments were made, and for what object or purpose the same was made. Also, all indebtedness or liabilities incurred or existing at the time, and for what the same were incurred, and the balance of money, if any, on hand. And it shall be the duty of the directors to cause to be made a complete and accurate survey of the mine, together with maps or diagrams, showing such surveys; and such surveys shall be made just prior to each annual election, and the maps or diagrams shall accompany the annual report of the superintendent, and be posted in the office of the company for the inspection of all stockholders. Such account or balance sheet, survey, maps or diagrams, shall be verified under oath by the president and secretary, and posted in some conspicuous place in the office of the company. It shall be the duty of the superintendent, on the first Monday of each month, to file with the secretary an itemized account, verified under oath, showing all receipts and disbursements made by him for the previous month, and for what said disbursements were made. It shall also be the duty of the superintendent to file with the secretary a weekly statement, under oath, showing the number of men employed under him, and for what purpose, and the rate of wages paid to each one. He shall attach to such account a full and complete report, under oath, of the work done in said mine, the amount of ore extracted, the car sample assay value of the same, from what part of the mine taken, the amount sent to mill for reduction, the name of the mill, the amount of bullion received, its percentage of the car sample assay, the amount of bullion shipped to the office of the company or elsewhere, and the amount, if any, retained by the superintendent. It shall also be his duty to forward to the office of the company a full report, under oath, of all discoveries of ores or mineral-bearing quartz made in said mine, whether by boring, drifting, sinking, or otherwise, together with the assay value thereof and a copy of all surveys and maps or diagrams made of the workings in the mine since his last report. All accounts, reports, surveys, maps, or diagrams, and correspondence from the superintendent shall be posted in some conspicuous place in the office of said company and be open to the inspection of all stockholders. In case of the refusal or neglect of the superintendent to make and forward to the office of the company the accounts, reports, surveys, maps, or diagrams, provided for in this section, or in case he shall knowingly forward any false or incomplete account, report, survey, map, or diagram, he shall be guilty of a misdemeanor, and it shall be the duty of the directors of such corporation to remove, forthwith, the said superintendent, and thereafter he shall not be employed by any corporation existing under the laws of this State, and no salary shall be paid him, and any stockholder shall be entitled to recover, in any court of competent jurisdiction, against said superintendent the sum of one thousand dollars as liquidated damages.

SEC. 2. Any bona fide stockholder of a corporation formed under the laws of this State for the purpose of mining shall be entitled to visit, accompanied by his expert, and examine the mine or mines owned by such corporation and every part thereof, at any time he may see fit to make such visit and examination; and when such stockholder shall make application to the president of such corporation, he shall immediately cause the secretary thereof to issue and deliver to such applicant an order, under the seal of the corporation, directed to the superintendent, commanding him to show and exhibit such parts of said mine or mines as the party named in said order may desire to visit and examine. It shall be the duty of the superintendent, on receiving such order, to furnish such stockholder every facility for making a full and complete inspection of said mine or mines, and of the workings therein; it shall be his duty also to accompany said stockholder, either in person or to furnish some person familiar with said mine or mines to accompany him in his visit to and through such mine or mines, and every part thereof. In case of the failure or refusal of the superintendent to obey such order, such stockholder shall be entitled to recover in any court of competent jurisdiction, against said corporation, the sum of one thousand dollars and traveling expenses to and from said mine as liquidated damages, together with costs of suit. In case of such refusal, it shall be the duty of the directors of such corporation forthwith to remove the officer so refusing, and thereafter he shall not be employed directly or indirectly by such corporation, and no salary shall be paid him. [Amendment, approved April 23, 1880; Amendments 1880, 135 (Ban. Ed. 400); took effect from passage; repealed conflicting Acts.]

SEC. 3. In case of the refusal or neglect of the president to cause to be issued by the secretary the order in the second (2d) section of this Act mentioned, such stockholder shall be entitled to recover against said president the sum of one thousand dollars and costs, as provided in the last section. In case of the failure or neglect of the directors to cause said surveys and maps or diagrams to be made, or to remove the superintendent as provided in section one, or to have the reports and accounts, surveys, maps or diagrams made and posted, as is provided in the first section of this Act, within ten days after the refusal or neglect of the superintendent, they shall be liable either severally or jointly to an action by any stockholder in any court of competent jurisdiction, complaining thereof for each and every such refusal, neglect or failure, and on proof of such refusal, neglect or failure, such complaining stockholder shall recover judgment for one thousand ($1000) dollars liquidated damages, with the cost of suit, for each and every of such refusals, failures or neglects.

SEC. 4. Any bona fide stockholder of a corporation formed under the laws of this State for the purpose of mining may institute an action in his own name, or in the name of the corporation, to recover any and all moneys or property due to the corporation or to the stockholders thereof, and the judgment obtained therein shall inure to the benefit of the said corporation or its stockholders, as the case may be, subject to a lien on said judgment in favor of the plaintiff, for all sums of money expended by him for costs of suit and attorney's fees paid or agreed to be paid by plaintiff; *provided*, said money expended, costs of suit and attorney's fees do not exceed fifty per cent of the whole amount recovered.

SEC. 5. All Acts and parts of Acts in conflict with this Act are hereby repealed.

Silk in California.

The fifth annual report of the Ladies' Silk Culture Society of California has just been issued and is a document of very great local interest and importance, as it shows the accomplishment of many significant things. In the introductive portion of his report as president, Mr. W. B. Ewer points out clearly the amount of work which has been done with the limited funds intrusted to the board, and argues strongly against a disposition to underrate the accomplishment because, owing to the length of time required to establish a silk station and bring a mulberry grove up to the yield of large quantities of leaves, there have not been large results attained immediately. But Mr. Ewer proceeds to show, and in fact does show incidentally all through his argument, that there has been a vast amount of valuable work done, although the society has been constantly under the cloud of insufficient means to realize its plans and purposes. The items of this showing we have not space to set forth and must refer the student of the progress of silk-culture efforts to the perusal of the report itself. As it now stands, unless Congress shall take special action and restore the item for the Pacific Coast work to the appropriation bill, the Ladies' Society will be thrown again upon its own resources. The injustice of such refusal of Government aid is shown in this forcible paragraph in the report:

"The women of this, our Golden State, joined hands with their sisters in the East, and through wise management and slow but sure progress have demonstrated, beyond the possibility of a doubt, that the United States can produce silk of a quality not excelled by any other nation on the globe. The efforts on both sides of the continent have secured more or less aid from the Government. Their united efforts have reached results in ten years which took the Government of France fully one hundred years of time, and more than ten, probably twenty, times the amount of money that our own Government has expended. A careful and candid observation of the progress which has been made on this coast, we are fully persuaded, will not suffer in any way by comparison with what has been done at the East, even at a much larger expenditure, than has been appropriated for the work in California. All we ask is a slight advance on previous appropriations to carry out our work in full, as already outlined in this report. It is to be hoped that Congress will see the impropriety of with-